Operation & Maintenance Manual

SEAM011402

LW250-5

ROUGH TERRAIN CRANE

SERIAL NUMBERS LW250 (H-Outrigger)-53025 and up
LW250 (X-Outrigger)-50135

⚠ WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept near the machine for reference and periodically reviewed by all personnel who will come into contact with it.

NOTICE

Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

KOMATSU

1. FOREWORD SEAM011402

This manual provides rules and guidelines which will help you use this machine safely and effectively. Keep this manual handy and have all personnel read it periodically. If this manual has been lost or has become dirty and can not be read, request a replacement manual from Komatsu or your Komatsu distributor.

If you sell the machine, be sure to give this manual to the new owners.

Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult Komatsu or your Komatsu distributor for the latest available information of your machine or for questions regarding information in this manual.

This manual may contain attachments and optional equipment that are not available in your area. Consult Komatsu or your Komatsu distributor for those items you may require.

⚠ WARNING

- **Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.**
- **Operators and maintenance personnel should read this manual thoroughly before beginning operation or maintenance.**
- **Some actions involved in operation and maintenance of the machine can cause a serious accident, if they are not done in a manner described in this manual.**
- **The procedures and precautions given in this manual apply only to intended uses of the machine. If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. Under no circumstances should you or others engage in prohibited uses or actions as described in this manual.**
- **Komatsu delivers machines that comply with all applicable regulations and standards of the country to which it has been shipped. If this machine has been purchased in another country or purchased from someone in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult Komatsu or your Komatsu distributor before operating the machine.**
- **The description of safety is given in SAFETY INFORMATION on page 0-2 and in SAFETY from page 1-1.**

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

2. SAFETY INFORMATION

Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines. To avoid accidents, read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance.

To identify safety messages in this manual and on machine labels, the following signal words are used.

⚠ DANGER – **This word is used on safety messages and safety labels where there is a high probability of serious injury or death if the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may also result in serious damage to the machine.**

⚠ WARNING – **This word is used on safety messages and safety labels where there is a potentially dangerous situation which could result in serious injury or death if the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may also result in serious damage to the machine.**

⚠ CAUTION – **This word is used on safety messages and safety labels for hazards which could result in minor or moderate injury if the hazard is not avoided. This word might also be word for hazards where the only result could be damage to the machine.**

NOTICE – **This word is used for precautions that must be taken to avoid actions which could shorten the life of the machine.**

Safety precautions are described in SAFETY from page 1-1.

Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore the safety messages in this manual and on the machine may not include all possible safety precautions. If any procedures or actions not specifically recommended or allowed in this manual are used, you must be sure that you and others can do such procedures and actions safely and without damaging the machine. If you are unsure about the safety of some procedures, contact a Komatsu distributor.

3. INTRODUCTION

3.1 FEATURES

Excellent productivity and ease of operation:	Use of 32 m (104 ft 11 in) x 5-stage boom, and power extension plus power tilt jib, increased number of outrigger extension stages (x-shaped type --- 3 → 5 stages; H-shaped type --- 4 → 6 stages), light lever control thanks to new PPC valve
Superb mobility and safety in travel:	High output, high torque engine, transmission with all gear speeds electronically controlled, safe travel thanks to long wheel base and remarkably decreased overhang
Pleasant operating environment:	Comfortable operator's cab with large operating space and good visibility without front sash, plus hot-water type air conditioner
Further improved ease of entry into confined spaces:	Remarkably decreased boom overhang in traveling posture
Safety assured with fail-safe operations:	In addition to conventional fixed display, multi-functional graphic display dopted

3.2 BREAKING IN THE MACHINE

Your Komatsu machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life.

Be sure to break in the machine for the initial 100 hours (as indicated by the service meter.)

During breaking in:

- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starts, sudden acceleration, sudden steering and sudden stops except in cases of emergency.

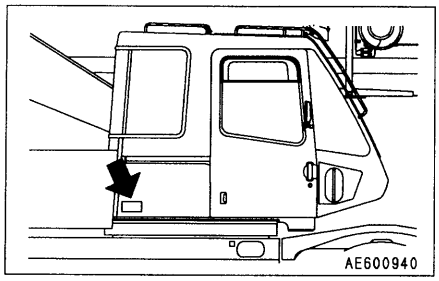
The precautions given in this manual for operating, maintenance, and safety procedures are only those that apply when this product is used for the specified purpose. If the machine is used for a purpose that is not listed in this manual, Komatsu cannot bear any responsibility for safety. All consideration of safety in such operations is the responsibility of the user.

Operations that are prohibited in this manual must never be carried out under any circumstances.

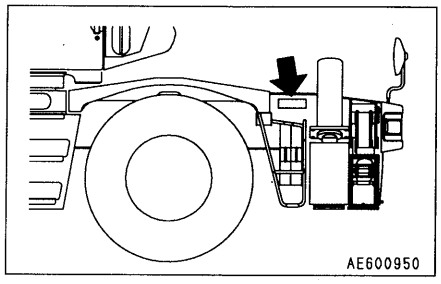
4. LOCATION OF PLATES, TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

4.1 MACHINE SERIAL NUMBER PLATE AND STAMP POSITION

The plate is on the right side of the cab.

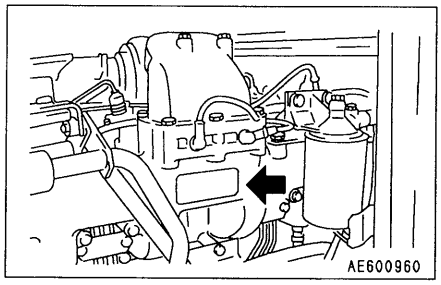


The stamp is on the rear right side of the chassis.

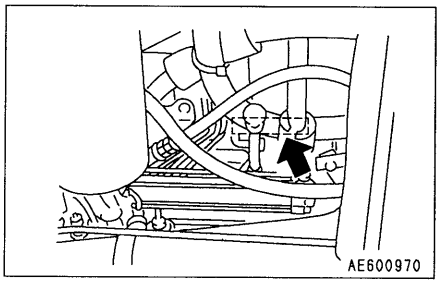


4.2 ENGINE SERIAL NUMBER PLATE AND STAMP POSITION

The plate is on the right side of the engine cylinder block as seen from the fan.



The stamp is on the right side of the engine cylinder block as seen from the fan.



4.3 TABLE TO ENTER SERIAL NUMBER AND DISTRIBUTOR

Machine serial No.:
Engine serial No.:
Distributor name: Address: Phone: Service personnel for your machine:

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SAFETY

⚠ WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

This safety section also contains precautions for optional equipment and attachments.

6. GENERAL PRECAUTIONS

⚠ WARNING: For reasons of safety, always follow these safety precautions.

SAFETY RULES

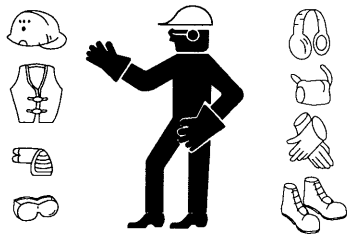
- ONLY trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- Do not operate the machine when in bad physical condition, taking medicine (which becomes sleep) or when drunk.
- When working with another operator or a person on worksite traffic duty, be sure all personnel make previous arrangements and understand all hand signals that are to be used.
- Follow all safety rules.

SAFETY FEATURES

- Be sure all guards and covers are in their proper position. Have guards and covers repaired if damaged.
- Make sure that you understand the use of safety devices such as the seat belt or lock pin of the winch clutch lever before you use them.
- Never remove any safety device under any circumstances. Take steps to ensure that the safety devices can always function properly.
  Lock pin of winch clutch lever → See "12.27 PARKING MACHINE".
  Seat belt → See "12.1.3 ADJUSTING BEFORE OPERATION".
- Mistaken use of the safety devices may lead to serious injury or death.

CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Avoid loose clothing and jewelry. They can catch on controls or protruding objects.
- Do not wear oily clothes because they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves when operating or maintaining the machine. Always wear safety goggles, hard hat and heavy gloves if your job involves scattering metal chips or minute materials. This is so particularly when driving pins with a hammer and when cleaning the air cleaner element with compressed air. Check also that there is no one near the machine.
- Check each safety wear.



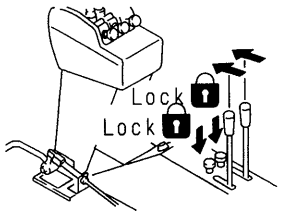
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UNAUTHORIZED MODIFICATION

Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

ALWAYS APPLY LOCK WHEN STANDING UP FROM OPERATOR'S SEAT

- When leaving the operator's seat, set the gear shift lever to the N (Neutral) position and turn on the parking brake switch and set the work equipment lever to the neutral position.
  In addition, set the lock knob to the lock position and turn the work equipment lever stand to the rear position. If the work equipment lever stand is not turned to the rear position, the work equipment may move abruptly causing serious injury.
- When leaving the machine, lower the load completely, place the gear shift lever at the N position, set the lock knob of the winch clutch lever to the LOCK position, then stop the engine. Always remove the key and take it with you.

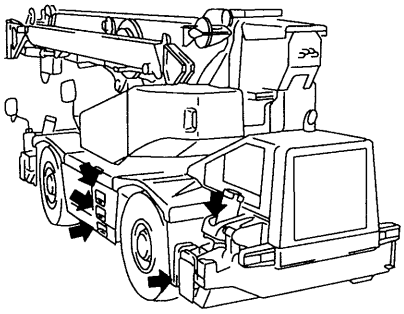


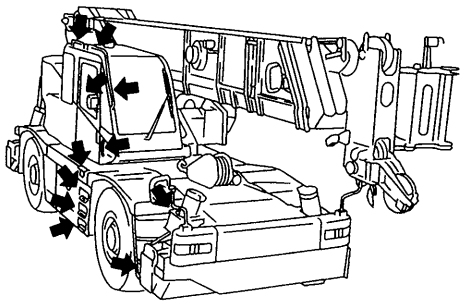
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MOUNTING AND DISMOUNTING

- NEVER jump on or off the machine. NEVER get on or off a moving machine. To do so causes injury.
- When getting on or off the machine, face the machine and always maintain three-point contact with the handholds and steps to ensure that you support yourself.
- Never hold any control levers when getting on or off the machine.
- If there is any oil, grease, or mud on the handholds or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.
- To avoid an injury by falling, do not mount on the boom or jib. When working at a height, use a working stand.
- When mounting on the chassis or wing stand for the purpose of inspection, watch your head and step. Carefully walk and do not slip. If there is a nonskid, walk on it. If the nonskid has come off, replace it with new one.


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FIRE PREVENTION FOR FUEL AND OIL

Fuel, oil, and antifreeze can be ignited by a flame. Fuel is particularly FLAMMABLE and can be HAZARDOUS.

- Keep flames away from flammable fluids.
- Stop the engine and do not smoke when refueling.
- Tighten all fuel and oil caps securely.
- Refueling and oiling should be made in well ventilated areas.
- Keep oil and fuel in the determined place and do not allow unauthorized persons to enter.



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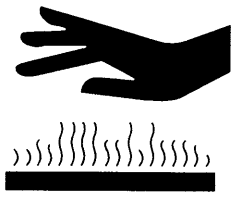
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PRECAUTIONS WHEN HANDLING AT HIGH TEMPERATURES

Immediately after operations are stopped, the engine coolant, engine oil, and hydraulic oil are at high temperatures, and are still under pressure. Attempting to remove the cap, drain the oil or water, or replace the filters may lead to serious burns. Always wait for the temperature to go down, and follow the specified procedures when carrying out these operations.

- To avoid the engine coolant blowing off, before removing the radiator cap, stop the engine and let the radiator cool. Turn the cap slowly to release the internal pressure before removing the cap. (When checking the coolant temperature, bring your hand close to the surface of the radiator just before touching it, and check the ambient temperature around the radiator.)

- To avoid the oil blowing off, before removing the radiator cap, stop the engine and let the radiator cool. Turn the cap slowly to release the internal pressure before removing the cap. (When checking the oil temperature, bring your hand close to the surface of the hydraulic tank just before touching it, and check the ambient temperature around the hydraulic tank.)
  The muffler is incorporated in the engine room. Do not touch the upper surface of the engine hood during opetarion or just after the engine stopped.

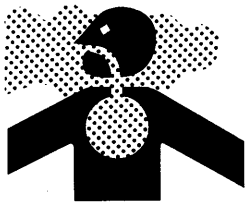


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ASBESTOS DUST HAZARD PREVENTION

Asbestos dust can be HAZARDOUS to your health if it is inhaled.
If you handle materials containing asbestos fibers, follow these guidelines as given below:

- NEVER use compressed air for cleaning.
- Use water for cleaning to keep down the dust.
- Operate the machine with the wind to your back, whenever possible.
- Use an approved respirator if necessary.



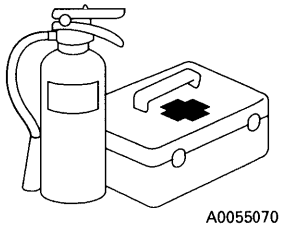
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CRUSHING OR CUTTING PREVENTION

Do not enter, or put your hand or arm or any other part of your body between movable parts such as between the work equipment and cylinders, or between the machine and work equipment.
If the work equipment is operated, the clearance will change and this may lead to serious damage or personal injury.
When enter between movable parts unavoidably, lock the work equipment so that they do not move.
See "8. PRECAUTIONS FOR MAINTENANCE".

FIRE EXTINGUISHER AND FIRST AID KIT

- Be sure fire extinguishers have been provided and know how to use them.
- Provide a first aid kit at the storage point. Check it periodically and supplement as necessary.
- Know what to do in the event of a fire.
- Be sure you know the phone numbers of persons you should contact in case of an emergency (emergency doctor, ambulance, fire station).



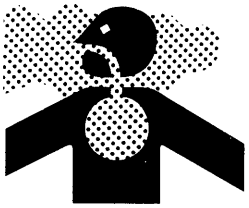
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PRECAUTIONS FOR ATTACHMENTS

- When installing and using an optional attachment, read the instruction manual for the attachment and the information related to attachments in this manual.
- Do not use attachments that are not authorized by Komatsu or your Komatsu distributor. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful life of the machine.
- Any injuries, accidents, product failures resulting from the use of unauthorized attachments will not be the responsibility of Komatsu.

VENTILATION FOR ENCLOSED AREAS

- If it is necessary to start the engine or to use fuel, cleaning oil or paints within an enclosed area, provide adequate ventilation by opening windows or door to avoid the gas poisoning. Provide a ventilation fan as neccesary.



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7. PRECAUTIONS DURING OPERATION

⚠ WARNING: Failure to follow these safety precautions may lead to a serious accident.

7.1 BEFORE STARTING ENGINE

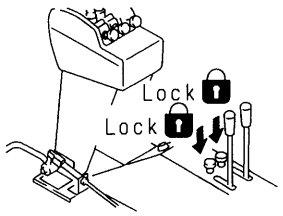
SAFETY AT WORKSITE

- Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.
- Check the condition of the road surface at the worksite, and determine the best and safest method of operation.
- Select a ground surface that is as hard and horizontal as possible when carrying out operations.
- If there is a cloud of sand, sprinkle with water before staring work.
- If you need to operate on a street, protect pedestrians and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- Check the depth and flow of water before operating in water or crossing a river. NEVER enter water which is in excess of the permissible water depth.
  Approval depth of water → See "12.14 PRECAUTIONS WHEN TRAVELING"
- The operator himself must carry out the final visual check to confirm the operating position, route, and existence of any obstacles before starting operations.

CHECKING BEFORE STARTING ENGINE

Check as follows before starting initial starting of engine in a day.
Failure to do that may cause serious injury.

- Check for flammable deposits around engine and battery, leftover fluid, leftover parts, tools lying around the operating seat, dirt on mirror, handholds and steps.
  Walk-around check → See "12.1.1 WALK-AROUND CHECK".
- Check the coolant level, fuel level, hydraulic oil level, clogging of air cleaner, electrical system.
  Check before starting → See "12.1.2 CHECK BEFORE STARTING".
- Adjust operator's seat as fitting the working posture, and check for damage or wear of seat belt and mounting parts.
  Adjusting operator's seat → See "12.1.3 ADJUSTING BEFORE OPERATION".
- Check the operation of guages, and check that gear shift lever is at the N position.
  The method of checking guages operation → See "12.1.4 OPERATION, CHECK BEFORE STARTING ENGINE".
  If there is any failure as the result of checking above, make sure to repair them.
- Check that the winch clutch lever lock knob is at the LOCK position before starting the engine.



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WHEN STARTING ENGINE

- Walk around your machine again just before mounting it, checking for people and objects that might be in the way.
- NEVER start the engine if a warning tag has been attached in the operator's cab.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while seated.
- Operator must never let anyone sit anywhere other than in the assistant driver's seat.
- Never start the engine by shorting starter circuit. It is very dangerous and causes damage to the equipment.

  Warning tag Part No. 09963-03000



7.2 OPERATING MACHINE

CHECK AFTER STARTING ENGINE

Failure to check after starting engine can causes delaying the detection of abnormalities , and causes serious injury or damage for equipment. Carry out checking at open space and without obstacles.

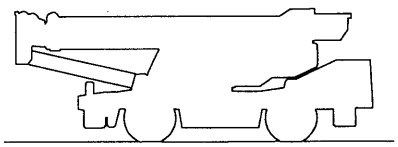
- Check the operating condition of equipments, boom, break, travelling and wing.
- Check abnormal noise, vibration, heat, smell or any abnormality of machine.
- If there is any abnormality, make sure to repair it.

  Using without repair can cause accidental injury or damage to the machine.

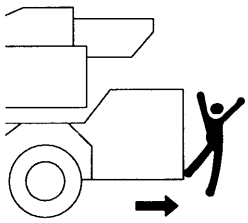
PRECAUTIONS BEFORE STARTING MACHINE

Before driving the machine, always check the direction of the chassis frame.

- Walk around your machine again just before starting machine, checking for people and objects that might be in the way.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while seated.
- Always wear your seat belt when operating.
- Operator must never let anyone sit anywhere other than in the assistant driver's seat.
- Check the horn and backup alarm (rear travelling alarm buzzer) for normal operation.
- Always close the door and check that the door lock is at the LOCK position.



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TEST DRIVE BEFORE TRAVELING

Test drive the machine at a safe place to check that the travel condition (travel speed, forward and reverse travel, operation of steering, braking effect) is normal before starting operations.

CHECK WHEN SWINGING OR TRAVELING IN FORWARD AND REVERSE

Before operating the machine or work equipment, do as follows.

- Slow down the speed earlier than usual and stop the machine before travelling in forward and reverse.
- Sound the horn to warn people in the area.
- Check that there is no one near the machine. Be particularly careful to check behind the machine.
- If necessary, designate a person to check the safety. This is particularly necessary when traveling in reverse.
- When operating in areas that may be hazardous or have poor visibility, designate a person to direct worksite traffic.
- Ensure that no unauthorized person comes within the turning radius or direction of travel. If necessary, put up fences.
- This machine is designed as the second boom goes forward than base boom, check that no one is in the rear side of base boom when second boom is stored or hoisted.

The above precautions must be followed at all times even when using machines equipped with backup alarm (rear travelling alarm buzzer) and mirror.

DO NOT HIT WORK EQUIPMENT

- When working in places where there are height limits, such as in tunnels, under bridges, under electric cables, or in garages, be extremely careful not to hit the boom or arm. If the machine is exceed the height limitation, take a long way around.

ENSURE GOOD VISIBILITY

- When working in dark places, install working lamps and head lamps, and set up lighting in the work area if necessary.
- Stop operations if the visibility is poor, such as in mist, snow, or rain, and wait for the weather to improve to a condition that allows operations to be carried out safely.

WORKING ON SNOW AND FROZEN GROUND

- Snow-covered and frozen ground may cause the machine to slip sideways, even if the grade is not steep. Slow down the machine when traveling on such ground, and avoid sudden starting, stopping, and steering. Especially on upward slopes and downward slopes, it is slippery and dangerous.
  In addition, fit chains to the rear wheels, and use the 4-wheel drive for traveling.
- As the temperature becomes higher, frozen ground bocomes soft. Be careful when travelling.

WORKING ON LOOSE GROUND

- Do not enter the weak ground. The machine cannot easily escape.
- Avoid operating your machine too close to the edge of cliffs, overhangs, and deep ditches. If these areas collapse, your machine could fall or tip over and result in serious injury or death. Remember that the soil after heavy rain or blasting is weakened in these areas.
- Earth laid on the ground and the soil near ditches are loose. They can collapse under the weight or vibration of your machine.

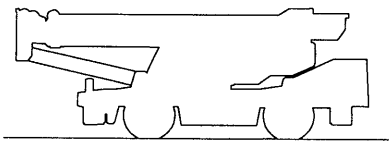
PRECAUTIONS IN COLD AREAS

- After finishing operation, wipe off waterdrop, snow or mud from wire harness, connectors, switches and sensors, and cover them. If water is frozen, the machine will malfunction the next time and cause unexpected accidents.
- Warm up the machine, or the reaction of the will become slow and this will causes unexpected accidents when operating control levers.
- When hydraulic temperature is low, set PTO switch to "WORK 1" or "WORK 2" and warm up the machine with engine middle speed rotation.
- Check the operation of the safety devices, switches, and sensors, and remove snow or carry out defrosting if necessary.
- Remove the snow and carry out the defrosting of the swing circle, outriggers, boom, and winch, and check that these parts move properly before starting operations.
- Always drain the water from the air tank.
- When operating the service brake or parking brake, if there is no sound of air escaping, check the pressure in the air tank and remove the snow or carry out the defrosting of the area around the brake valve.
- Warm up the engine properly before starting operations. Do not raise the engine speed immediately after starting the engine
- Check that the winch brake and clutch work properly.

7.3 PRECAUTIONS WHEN TRAVELING

SET TO TRAVEL POSTURE

- Set the work equipment to the travel posture shown in the diagram on the right before traveling.



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- Fix the hook securely and apply the drum lock.
- When swinging, set the boom angle so that the boom does not contact with the mirror or other parts. Fix the movable parts.
- Place all control levers at the neutral position.
- Stow the outriggers.
  Check that the outrigger EXTEND/RETRACT selector switch is at neutral, and that the outrigger switch pilot lamp is off. Make sure to insert the outrigger lock pin.
- Set the PTO switch at "RUN".
- Set the steering mode switch to the " " position and set to front 2-wheel steering. Check that "Lock" lamp of rear steering lock is lighting up.
- Set the swing lock lever to the LOCK position. Fix the movable parts.
  It is forbidden to load other than standard equipment on public roads. Never load other than the standard equipment.

PRECAUTIONS BEFORE TRAVELING

- Before traveling, check the width, the height limitation of the ground and mass limitation of the bridge on the expected route, and ensure that crane can pass through.
- About traveling on roads, there may be some restrictions of the traffic law that are enacted by the country and the district. Follows these law and travel safely.
- Check for cut, lodging of pebble or abnormal wear on tire. Check looseness of the tire mounting wheel bolts.
- Check that the air pressure gauge reading is 0.5 – 1.0 MPa(5 – 10 kgf/cm^2).
- Always be aware of the condition of the brake wear.
- Check that all the monitor lamps are working normally.
- Check the operation and lighting up of the brake lamp.
- Check that the working lamp is not on.
  If you drive on roads with the working lamp on, this will cause problems for other traffic.
  It is prohibited to travel on roads with the working lamp on by the law of "Maintenance of public security basis for road traffic".
- Do not apply special steering mode (4-wheel steering, crab steering, rear steering) and reverse steering compensation on public roads.
  Travel with front 2-wheel steering on public roads.
  Special steering mode and reverse steering compensation are limited in enclosure at low speed.
- On public roads, do not use 4-wheel drive unless there are special conditions (the road is covered with snow). Using the 4-wheel drive will cause premature wear of the tires.
- Make sure to open the engine hood shutter on traveling. If it is closed, it causes engine overheating.
- Always keep the door of the operator's cab closed.
  If you travel with the door open, there is danger that the door may come out of the detent or suddenly slam shut if the brakes are applied suddenly or if the machine goes down a steep hill.

PRECAUTIONS WHEN TRAVELING

- This machine meets the overall width, mass, axe weight, adjacent axe weight, grounding pressure values specified in "Maintenance of public security basis for road traffic". Obey the law and travel safely.
  Passage permit enacted by traffic limitation is needed when traveling. Follow the passage conditions descripted on it. This machine cannot travel on the superhighway that the lowest speed is limited to 50 Km/h (31 MPH).
- Never turn the key in the starting switch to the OFF position when traveling.
- If the engine should stall while the machine is traveling, the steering wheel will become heavy. Move the machine immediately to a safe position and stop the machine.
- If the machine travels in engine stopped condition, the foot break has no effect because air is not supplied to the air tank. Furthermore, power equipment does not act during steering operation and handling becomes heavy. If the engine is stopped when traveling, immediately slow down speed, move to safe place and restart the engine.
- If the torque converter overheat caution lamp (red) lights up when traveling, stop the machine, set the engine to low idle, and wait until the temperature falls.
- If the reading of engine water temperature guage points red zone when traveling, engine is overheated. Move the machine to a safe place, operate idling and let the temperature fall.
- When traveling from habit with setting the gear shift lever to the N position, transmission may be damaged. Furthermore, it is ineffective to use engine as break, it is very dagerous. Do not set gear shift lever to the N position.
- Do not depress the break pedal frequently when appling the break. Frequently appling the break causes the lack of air and pressure, as a result, the break is not effective. When the air pressure goes down and the alarm sounds, immediately move to a safe place and stop the machine, set the gear shift lever to the N position, increase the engine rotation to supply air. Check that air is supplied fully before traveling.
- If the air pressure in the air tank goes down, it is very dangerous because the breaking power falls. Be aware of the air pressure guage when traveling.
  If the air pressure goes down when traveling, the air pressure dropping caution lamp light up and alarm sounds. Immediately stop at a safe place and inspect the air system.
- When turning the narrow corner, be careful not to touch buildings. Especially, the auxiliary jib is mounted at the left side of boom, pay attention to the front side edge of jib.
- When reverse traveling, arrange a person who gives signs to ensure safety. Check that the reverse traveling alarm system is normal.
- Inattensive driving is dangerous. Always pay attention.
- Overspeeding and sudden starting, stopping, swinging and meandering are dangerous. Never do any of these.
- If there is any abnormality (sound, vibration, going wrong of gauges, air leak, oil leak), immediately stop the machine at the safe place and clear up the cause.
- Do not perform sudden steering operation. The machine will be thrown off balance and damage itself or structures around the machine.
- Avoid riding over obstacles as much as possible. If you must ride over obstacles, travel at low speed. Never travel over obstacles which cause the machine to tilt excessively (more than 10°). Riding over such large obstacles could cause the machine to tip over on its side.
- Keep a safe distance from other machines or structures to avoid touching during traveling or operating.
- Obey the permitted depth.
  Permitted depth → See "12.14 PRECAUTIONS WHEN TRAVELING"
- When going over bridges or structure of private land, make sure that they can support the machine before crossing. For public roads, obey local regulation.
- Do not operate the reverse steering switch when traveling. If the reverse steering switch is pressed when traveling, steering feeling changes and it may causes injury or death.

PRECAUTIONS WHEN TRAVELING (continued)

- If the reverse steering switch is turned ON when the machine is traveling forward, the direction of turning will be the reverse of the direction of operation of the steering wheel, so never touch the reverse steering switch when traveling.
- Always stop the machine, depress break and set gear shift lever to N position before switching between 2-wheel drive and 4-wheel drive.
- Always keep the door of the operator's cab closed when traveling.
- Watch your head and step in narrow or dark spaces.

USING BREAK

- During traveling, do not place your foot on the break pedal other than when necessary. Traveling when placing foot on break pedal activates break all the time and break is heated abnormally, as a result the break has no effect and accidents occure.
- Do not control (adjust) speed by slightly depressing the break pedal. The break is heated and has no effect when needed.
- When traveling on down slopes, always use the engine as a break and use the break pedal at the same time.

TRAVELING ON SLOPES

- Traveling on slopes could result in the machine tipping over or slipping.
  Method of traveling on slopes → See "12.14 PRECAUTIONS WHEN TRAVELING".

- Do not travel on grass, fallen leaves, or wet steel plates. Even slight slopes may cause the machine to slip to the side, so travel at low speed and make sure that the machine is always traveling directly up or down the slope.

- When traveling down slopes, release foot break after engine rotation raised fully so that they do not move backward.
  Strat at steep uphill with 4WD LOW.

- Follow as followings:
  (1) Attention to speed ... As on downhill, travel at the speed as following:

HI	L	23 km/h (14 MPH)	LOW	1	9 km/h (6 MPH)
	2	41 km/h (25 MPH)		2	17 km/h (11 MPH)
	D	49 km/h (30 MPH)		D	26 km/h (16 MPH)

  (2) Gear shift down operation ...Shift down at under the following speed:

HI	D → 2	35 km/h (22 MPH)	LOW	D → 2	14 km/h (9 MPH)
	2 → 1	20 km/h (12 MPH)		2 → 1	7 km/h (4 MPH)

  (3) When the overrun alarm buzzer sounds, Immediately reduce the speed and travel at a safe speed.

  (4) According to the slope condition, shift down and use the engine as a break. If speed still increases, use the exhaust brake and minimize the using of foot break. If the foot break is used frequently, break is heated, as a result it causes damage to the break system and other parts. The foot break must be used intermittently and effectively.

  (5) Do not raise the engine rotation over 2700 rpm.

PARKING MACHINE

- When parking, set the gear shift lever to the N position and park on level ground, no fear of falling rocks and landslide, low and no submergence. Apply the parking break after the machine has stopped fully except in emergency cases.

- When parked, do not idle the engine excessively.

- Do not leave the operator's seat with the engine engaged. If the gear shift lever is set to other than the N position, the machine will move because of creep phenomenon, or the machine will suddenly start if the accelerator is depressed by accident.

- Park on level ground whenever possible. If the machine must be stopped on a slope, block the wheels to prevent the machine from moving.

- When parking on public roads, park the machine so that the machine, flags, and fences do not obstruct traffic, and provide fences, signs, flags, or lights, and put up any other necessary signs to ensure that passing traffic can see the machine clearly.

- When leaving the operator's seat, lower the load to the ground and set the gear shift lever to the N (Neutral) position and set the work equipment lever to the neutral position. In addition, set the lock knob to the lock position and turn the work equipment lever stand to the rear position, then stop the engine. Be sure to return the key and keep it at the specified place.
  Work equipment posture → See "12.27 PARKING MACHINE".
  Locks → See "12.31 LOCKING".

- Follow the instructions when starting or leaving operator's seat.
  - Set the gear shift lever to the N position.
  - Set the work equipment lever to the neutral position and set the lock knob to the lock position, then turn the stand to the rear position.
  - Set swing break switch to ON and parking the break switch to the PARK position.
  - Lower the load on the ground and set the main and auxiliary winch drum lock lever to LOCK.

  Always take the key with you.

- Follow the instructions when stopping the engine.
  - Idle the engine for 5 minutes before stopping the engine. Failure to do so causes damage to the turbocharger.

- Follow the instructions when carring out the maintenance.
  - Carry out the maintenance on level and rigid ground.
  - Always stop the engine and be sure the machine is unloaded.

- Always close the door of the operator's cab.

7.4 PRECAUTIONS WHEN USING CRANE

7.4.1 GENERAL PRECAUTIONS

LIFTING LONG OBJECTS

It is dangerous to lift long objects because the load is unstable. When lifting such loads, attach guide ropes to both ends of the load to improve the stability.

BENDING OF BOOM

When a load is lifted, the boom will bend, and this will increase the working radius. Always take this into account when carrying out lifting operations.

CHANGES IN TEMPERATURE

When the temperature changes, the volume of the hydraulic oil in the cylinders will also change. Therefore, if operations are carried out when the hydraulic oil is at a high temperature, the oil temperature will drop as time passes, and the volume of the hydraulic oil will be reduced. As a result, the boom will move down or will be retracted, so operate the lever to compensate for this.

CHECK WEATHER REPORT

- If there is lightning, stop operating the crane and stow the boom.
- If there are gusts of wind exceeding 10 m/s, stop the crane operation and stow the boom (jib). Retract the boom fully, then lower it and apply the swing lock securely.
- Even when the maximum wind speed is less than 10 m/s, the larger the load, the higher the load is lifted, and the longer the boom (jib) is, the greater the effect of the wind.
- When using the long boom, the wire rope on the winch and the electric signal cables will also be blown by the wind.
  Furthermore, when working near tall buildings, the wind tends to be funneled between the buildings, and this may increase the wind speed.
- When raising loads with a large wind-contact area, such as steel plates, there is danger that the wind from the front, rear, and side of the boom (jib) may damage the boom (jib) or cause the machine to overturn, so be extremely careful when carrying out such operations.
- When a load is not being lifted, there is danger that wind from the front of the boom may cause the machine to tip over to the rear, so be extremely careful when carrying out such operations.

PAY ATTENTION TO AERIAL LINE

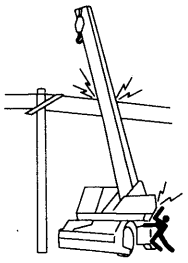
- When working near telephone lines or aerial lines, keep a safe distance from them.
- Take preventive steps beforehand, such as fitting covering tubes to the power line, or attaching warning messages, or positioning workers to observe safety.

KEEP CLEAR OF HIGH VOLTAGE POWER LINES

Precautions when working near power lines

- If you approach a high-voltage power line, there is danger of electric shock. Take the following preventive action.
  1) Always maintain the following safe distances between the machine and the power line as follows.

	Voltage	Safe distance
Low voltage	100 • 200 V	2 m (7 ft)
	6,600 V	2 m (7 ft)
Special high voltage	22,000 V	3 m (10 ft)
	66,000 V	4 m (14 ft)
	154,000 V	5 m (17 ft)
	187,000 V	6 m (20 ft)
	275,000 V	7 m (23 ft)
	500,000 V	11 m (36 ft)



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  2) Take preventive steps beforehand, such as fitting covering tubes to the power line, or attaching warning messages, or positioning workers to observe safety.
  3) Wear shoes with rubber or leather soles.

- Contact the electric power confirm to the voltage in the power lines at the worksite.

- When carrying out operations near high-voltage power lines, do not allow anyone to approach the machine.

ACTION WHEN COMING INTO CONTACT WITH POWER LINE

If the machine comes into contact with the power line, and becomes charged with electricity, rushing to leave the operator's compartment will only increase the danger. You will not suffer electric shock if you stay in the operator's seat.
First, remain calm. Then do the following.

- Contact
  Contact the power company or company in charge of the power line and have them stop the power or take other emergency action.

- Move all workers away from the crane
  Move all workers away from the crane to prevent any secondary disaster.
  The crane is charged with the electricity, so if any other worker is holding the winch rope or guide rope and suffers electric shock, get him to escape under his own power. Do not try to help him. This will only lead to more people being electrocuted.

- Emergency action
  If any worker are electrocuted when the crane contacts the power line, take the following action.
  1) Operate the crane to remove the structural parts of the crane from the area in contact with the power line. Carry out this operation carefully, because there is danger of cutting the power line.
  2) Escape from the area in contact with the power line. After ensuring that the crane is not changed with the electricity, rescue the electrocuted workers and promptly provide medical treatment.

ACTION WHEN COMING INTO CONTACT WITH POWER LINE (continued)

- Method of escape for the crane operator in emergencies
  The safest procedure for the crane operator is to stay in the operator's compartment until the power company has stopped the flow of electricity through the wires which the crane has contacted. If this is impossible, operate the crane to move the structural parts of the crane away from the contact with the power line, then escape from the operator's compartment.
  If the crane is in any of the conditions listed below, get out of the operator's compartment and jump off as far as possible away from the machine. When you land, make sure that no part of your body touches the machine. It is extremely dangerous to touch the machine, as you will be electrocuted.
  1) The engine does not work.
  2) The crane has been damaged and does not move.
  3) The power line has been cut and cannot be removed from the crane.
  4) Other emergencies.

- If such an accident happens, always have the crane inspected by Komatsu or your Komatsu distributor before using it again.

Precautions when operating crane near high-power transmitters
When operating the crane near high-power transmitters, such as radar, or television or radio transmission antennas, there is danger that the structural parts of the crane will attract the electric waves and generate inductive current. There is also danger that the mechatronics systems may be damaged or adversely affected.

USE ONLY FOR SPECIFIED PURPOSE

Never use the crane to raise or lower workers.

OPERATE CRANE SLOWLY

Operate the crane slowly until you become accustomed to it.

DO NOT HANDLE CRANE ROUGHLY

Do not operate the levers or accelerators suddenly. In particular when swinging, always operate at low speed.

DO NOT ALLOW PEOPLE INSIDE WORKING RADIUS

- Never allow anyone to come inside the working radius.
  Enclose the working radius with setting up a barricade and hook the caution tag.

CHECK SAFETY BEFORE OPERATING PTO

Before operating the PTO, check that the lever and pedals are in the neutral position, and that they are locked.

DO NOT LEAVE OPERATOR'S SEAT WHEN LOADED

Do not leave the operator's seat with a load still raised.
Never leave the operator's seat while loading. When you leave the operator's seat, lower the load to the ground and do the following.

- Set the work equipment control lever lock knob to the LOCK position.
- Tilt the lever stand backward.
- Set the winch clutch lever lock knob to the LOCK position.
- Stop the engine and pull the key out, and lock the door of the operator's compartment.

WIND IN HOOK WHEN NOT USING

Wind in the hook when you are not using it.

DO NOT USE MACHINE BEYOND CAPACITY

Carrying out operations that exceed the capacity of the machine will lead to accidents or failure. In particular, with crane operations, always keep to the load given in the rated overall load table.

BE READY TO OPERATE BRAKE WHEN USING FREE FALL

Do not remove your foot from the winch brake pedal during free-fall operations.

DO NOT STRAIN WIRE WHEN WINDING IN

Be careful not to let the wire catch on trees or metal structures when carrying out operations. If the wire gets caught, do not continue to wind in. Free the wire, then continue the winding-in operation.

IT IS PROHIBITED TO PULL IN LOADS OR TO PULL LOADS SIDEWAYS OR VERTICALLY

Do not pull the load in or pull it sideways or vertically.

7.4.2 PRECAUTIONS FOR CRANE OPERATIONS

CHECK CRANE BEFORE STARTING

Check that the safety devices and crane work properly before starting.

- Operate each control lever, pedal, and switch without using a load and check that they work properly. Repair any abnormality immediately.
- Check that the Moment Limiter (overload prevention system) works properly.

PRECAUTIONS WHEN SELECTING POSITION FOR CRANE

Always set the crane on level firm ground. It is dangerous to set the crane in the following places.

- Simple asphalt paved surfaces
- Thin concrete paved surfaces
- Stone pavement
- Places where water has got under the paved surface and created holes; where the surface looks hard but the soil inside is soft.
- Places close to the road shoulder or holes dug in the road.
- When working on slopes, make the surface horizontal.
- If the crane is not placed on a horizontal surface and lifting operations are carried out with the machine at an angle, the Moment Limiter (overload prevention system) will not work properly, the machine may overturn, unexpected force may be brought to bear on the machine, or the machine may be damaged.

STABILITY OF CRANE

The stability of a crane is determined in the side direction. The stability in a diagonal direction is greater, but if the rated load is exceeded during operations, the boom and chassis may be damaged. Even in the diagonal direction, the Moment Limiter (overload prevention system) must not be turned off.

PRECAUTIONS WHEN SETTING CRANE

- Apply the parking brake.
- Always extend the outriggers to the MAX, MID, or MIN position. If the outriggers are not extended property, it is not safe.
- Each outrigger can be extended individually to the MAX, MID, or MIN position. The outrigger setting for the Moment Limiter (overload prevention system) can also be set individually on the left and right, but it cannot be set at the front or rear.
- Make sure that the Moment Limiter (overload prevention system) display matches the actual extending status, and depress the outrigger setting switch.
  The machine may overturn, so it is extremely dangerous if this setting is mistaken.
- Depending on the way in which the outrigger is extended (MID, MIN, on-tire operation), even when there is no load, the Moment Limiter (overload prevention system) may detect an overload and sound the alarm depending on the swing position of the boom.
  In such cases, retract or raise the boom to escape from the danger range, then reconsider the safety of the posture or position for the crane operation.
- When setting the crane in a place where the ground is considered to be soft, always take suitable action, such as putting wooden blocks under the jack feet to match the conditions, and always maintain a horizontal firm surface. On soft or uneven ground, the wooden blocks may break. Check the setting condition during working repeatedly.
- After setting the crane, check that the tires have come off the ground surface, then use a spirit level to check that the machine is horizontal.
- During outrigger operation, do not let anyone come near movable parts such as the outrigger beam or jack cylinder.
- As a general rule, set the outrigger to the maximum extension as much as possible.
- When extending the outrigger, fix the outrigger in its place using slide stopper pins. If the outrigger is not fixed, it can draw back during working, and turn over because the steadiness is lowed.
- When using the outriggers and lifting with the boom to the side, the machine will overturn if the outriggers are moved.

Method of setting outriggers → See "12.35.6 METHOD OF SETTING FUNCTIONS AND MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)".

PRECAUTIONS DURING OPERATION

- Do not cancel the operation stop condition and continue work.
- Always pay attention to the Moment Limiter (overload prevention system) display and alarm when carrying out operations.

PRECAUTIONS WHEN OPERATING CRANE

- Failure to use crane leads damage of crane or turning over, as a result it is a danger for death.

Precautions when crane operation → See "12.15 PRECAUTIONS BEFORE CRANE OPERATIONS".

HANDLING WIRE ROPE

- The wire ropes are weakened as time passes. Check them before starting work (every time), and if they need repair, immediately replace them. Check sheaves of the boom front edge and hooks at the same time. If the sheaves are damaged, the wire ropes are damaged rapidly.
- Use wire rope that are specified by Komatsu.
- Always use leather gloves when handling wire rope.
- Never use wire rope in the following conditions.
  - Wire rope where more than 10% of the wires in one strand (excluding filler wires) are broken.
  - Wire rope where the wear diameter exceeds 7% of the nominal diameter.
  - Wire rope with kinks.
  - Wire rope with marked loss of shape or corrosion.
  - Wire rope damaged by heat or spark.

PRECAUTIONS WHEN OPERATING WINCH

- Select a hook that matches the weight of the load and a suitable number of loops of wire rope to match the length of the boom.
  Fitting wire rope → See "12.34 HANDLING WIRE ROPE".
- Never let anyone go under a raised load.
- When carrying out lifting operations, stop at the point where the load leaves the ground, then check that it is safe before continuing the lifting operation.
- Do not pull the load sideways, or pull it in, or raise at an angle.
- It is dangerous to operate the clutch lever during winch operations, so do not operate it.
- It is prohibited to carry out free-fall operation with a raised load. Carry out free-fall when not loaded and only the hook is there. When it must be carried out free-fall, it should be 1/5 of rated overall load never apply a sudden break. If these instructions are not followed, the frames can be damaged the or the machine can turn over.
- If the wire rope is twisted and the hook rotates, remove the twisting before continuing the operation.
  Method of removing twisting from wire rope → See "12.34 HANDLING WIRE ROPE".
- Except when carrying out free-fall operations, set the clutch lever to the ON position and lock it with the lock knob.
- When winding out, always leave at least 3 loops of wire rope on the drum. (The wire ropes are marked with yellow paint.)

PRECAUTIONS WHEN RAISING OR LOWERING BOOM

- Do not raise or lower the boom suddenly.
- It is prohibited to pull loads in or up by raising the boom.

PRECAUTIONS WHEN TELESCOPING BOOM

- When retracting or extending the boom, check the operation of the winch.
- Do not operate the lever suddenly.

PRECAUTIONS WHEN SWINGING

- Apply the swing brake when not carrying out swing operations.
- When swinging from the side where the outriggers are extended further to the side where the outriggers are extended less, the machine may overturn even when no load is raised, so always pay careful attention to the direction of swing and the setting of the outriggers.
- It is prohibited to pull loads in or up using the swing operation.

HANDLING JIB

- Select a suitable position for the Moment Limiter (overload prevention system) working mode setting switch that matches the operating condition of the jib.
- When the boom is brought down thoroughly with extending the jib, extend the outrigger to the maximum and the boom length is under 11.6 m (38 ft).
- It is prohibited to carry out free-fall operation with a raised load.

7.4.3 PRECAUTIONS FOR SPECIAL CRANE OPERATIONS

PRECAUTIONS WHEN LIFTING WITH TWO CRANES

- Do not lift with two carnes because it is dangerous.
  If a job must be carried out using two cranes, always observe the following instructions.
  - Both cranes should be the same model.
  - Select a crane model that gives ample margin for the load being lifted.
  - Always designate one person to give signals.
  - It is a basic rule to operate only the crane. Do not carry out swing operations.

CRANE OPERATION AT WORKSITES RAISING LOAD FROM BELOW GROUND

- Select a model which has ample winch wire.
- As far as possible, set the crane in a position where the outriggers can be extended to the maximum width.
- Always observe the signals and operate safely.
- Be particularly careful when operating the crane.
- When winding out, always leave at least 3 loops of wire rope on the drum.
- It is prohibited to use free-fall operations.

LIFTING OPERATIONS USING HOOKS OF BOTH JIB AND BOOM

- Do not load on the boom and the jib seperatedly at the same time. The boom can be damaged or turned over.
- Do not perform boom operation with mounting the jib. When absolutely necessary, follow "12.35 Setting Moment Limiter (overload prevention system)" and be carefully to carry out.
- It is dagerous to lift one load using the boom and the jib. Do not do that as much as possible. When do as so, follow "12.35 Setting Moment Limiter (overload prevention system)" and be carefully to carry out.

STATIONARY LIFTING OPERATIONS

- Operate the suspension switch for LIFT, then LOCK it to lock the axle and frame securely.
- There is a big difference in the rated overall load depending on the working range. When loading in the front and swing to the side, always carry out to swing within the feature of 360°. Overloading may causes turning over.
- Set the Moment Limiter (overload prevention system) operation mode set switch to the ON-TIRE position.
- Check the tire inflation pressure, and if it is below the specified pressure, add air to the tires.
  Specified tire inflation pressure → See "12.1.2 CHECK BEFORE STARTING".
- It is prohibited to carry out free-fall operations or operations which will exceed the specified jib and boom length.
- It is prohibitted to use with swing-free.
- When operating with over-front lifting, insert the swing lock pin.
- During the crane operation, apply the auxiliary brake.
- Set the machine on horizontal firm ground when carryingout stationary lifting operations.
- Use only over-front lifting for stationary lifting operations. If swing operations are used, the machine will tip over. When swinging, swing slowly as correcting working radius.

TRAVELING WITH RAISED LOAD

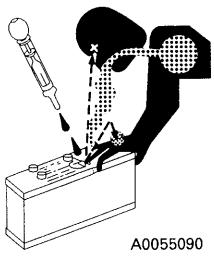
- Do not travel with load raised because the macine is insecurity and it is very dangerous to turn over. Especially on the uneven ground. tilt to the side and roling ground are dangerous. When the machine must be traveled with the load raised, do as follows.
- Operate the suspension switch for LIFT, then LOCK it to lock the axle and frame securely.
- Do not operate the swing when traveling with a raised load.
- Extend the outrigger fully and make longer the outrigger float as a little apart from the ground.
- Always follow the precautions given in the operation manual.
  → See "12.18 WHEN OUTRIGGERS ARE NOT USED".
- When traveling with a raised load, travel at a maximum speed of 1.6 km/h (1 MPH), and avoid sudden starting, stopping, gear shifting, or any other operation during travel which will cause the load to sway.
  Travel at a low speed and take action to prevent the load from swaying by using the guide rope.
- Do not travel on the inclining ground and select the most even and horizontal ground. If such route can not be found, level the ground.
- Do not travel on the soft ground. The tires can sink into the ground and it can causes turning over.
- Make sure that the load is well within the capacity of the crane and keep the load just clear of the ground. When carrying the load with the height that is closed to the ground, there is danger of turning over. Always prepare for lowering the load at any time.
- Set the Moment Limiter (overload prevention system) operation mode set switch to the LIFT-TRAVEL position.
- Always carry out the operation with the work equipment in the specified posture.
- Position signalmen when carrying out travel operations.
- Remove all obstacles from the travel path, and do not let anyone enter the area.
- It is prohibited to operate the crane when traveling with a raised load.
- Shorten boom as possible. It is prohibited to carry out free-fall operations or operations which will exceed the specified jib and boom length. It is prohibitted to use with swing free.
- Check the tire inflation pressure, and if it is below the specified pressure, add air to the tires.
  Specified tire inflation pressure → See "12.1.2 CHECK BEFORE STARTING".
- The rated overall load is the load under the maximum conditions, so operate with a load that is safe for the operating conditions.
- Consider the ground conditions and operating conditions, and travel with a raised load only in places where it is judged to be safe.
- When traveling with a raised load, apply the swing brake and insert the swing lock pin.
- When traveling with a raised load and the passing under an electric line (especially a high-voltage power line) is not avoidable, always maintain the safe distance and travel by positioning workers to observe safety.

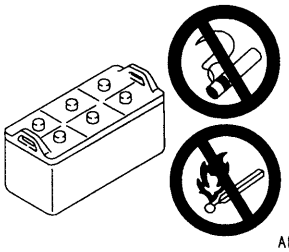
7.5 BATTERY

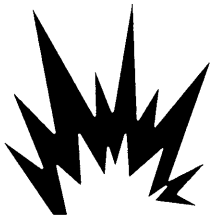
BATTERY HAZARD PREVENTION

Battery electrolyte contains sulfuric acid and generates hydrogen gas. Failure to use it properly can cause injury or fire. Do as follows.

- Do not bring open flames or cigarettes near the battery.
- When working with batteries, always wear safety glasses or goggles.
- If you spill acid on your clothes or skin, immediately flush the area with large amounts of water.
- Battery acid could cause blindness if splashed into the eyes. If acid gets into the eyes, flush them immediately with large quantities of water and see a doctor at once.
- If you accidentally drink acid, drink a large quantity of water or milk, beaten egg or vegetable oil. Call a doctor or poison prevention center immediately.
- Before working with batteries, stop the engine and turn the starting switch to the OFF position.
- Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals.
- When removing or installing, check which is the positive ⊕ terminal and negative ⊖ terminal.
- Tighten the battery terminals securely.
- When the battery acid level reaches the LOWER LEVEL (lower limit), add distilled water within the UPPER LEVEL (upper limit).
- When cleaning the upper surface of battery, wipe off with clean cloth. Never use gasoline or thinner which is organic solvent or cleaner.
- Securely tighten the battery cap.
- Do not charge battery or start engine with other power source when battery acid is frozen. Doing so can cause fire.
  Thaw the frozen battery acid and check battery acid leak before charging or starting with another power source.
- Remote battery from the machine before charging battery.


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CHARGING BATTERY

Failure to charge the battery can lead to an explosion. Strictly observe the instructions of using battry and manual accompanied by battery charger, and follow the instructions.

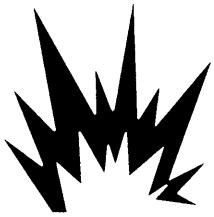
- Carry battery to well ventilated place and remove the battery cap. Apply hydrogen gas to avoid an explosion.
- Set the battery charger voltage according to the battery voltage charged.
- Failure to set the voltage may lead to the explosion caused by overheat ignition.
- Fix the ⊕ charging clip of the battery charger to the ⊕ terminal of the battery, then the ⊖ charging clip to the ⊖ terminal.
- Set the charge current to less than 1/10 of the battery rated capacity and when rapid discharging, to less than the battery rated capacity.
  Over charging current may lead to fire and explosion caused by the battery acid leaking or discharging.

STARTING WITH BOOSTER CABLES

Failure in connecting the booster cables can cause fire. Follow these instructions.

- Start using two persons, and one person sitting on the operator's seat.
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, for both normal and troubled machines, set the starting switch key to OFF.
- Be sure to connect the positive ⊕ cable first when installing the booster cables. Disconnect the ground or negative ⊖ cable first when removing them.
- For the final ground connection, connect it to the engine block of the troubled machine. At this time, because sparks occur, connect it as far as possible from the battery.
- When disconnecting the booster cables, avoid contact between the clips, or between the clips and the machine.

Starting with booster cables → See "15.2 IF BATTERY IS DISCHARGED".



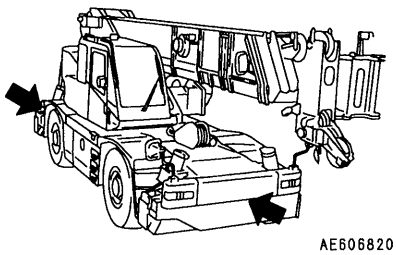
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7.6 TOWING

WHEN TOWING, ATTACH WIRE TO FRAME

Injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection of the wire rope, so always do as follows.

- Towing is for moving the machine to a place where inspection and maintenance can be carried out, and not for moving it long distances.
  Do not tow the machine more than necessity.
- NEVER allow a disabled machine to be towed on a slope.
- Do not use a kinked or frayed wire rope.
- Do not straddle the towing cable or wire rope.
- When connecting up a towing machine, do not let anyone enter the area between the towing machine and the equipment being towed.
- Set the towing machine and the towing connection of the equipment being towed in a straight line when connecting it.
- Put on leather gloves when using wire rope.
- When preparating towing by group work, arrange signs before working.
- When the engin of the damaged machine do not start or there is some damage in the break system, always contact Komatsu or the Komatsu distributor and repair them.
- When towing a damaged machine, use wire strong enough for the weight of the damaged machine.
- Carry out towing slowly. When the chains or the ropes are pulled suddenly, they may be cut. Remove the loose ones and keep them strained during towing.



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8.1 BEFORE CARRYING OUT MAINTENANCE

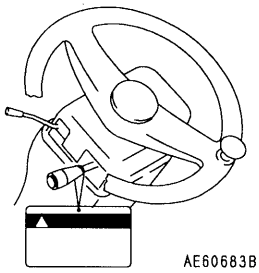
CONTACTING ABOUT FAILURE

Carring out the maintenance not described in this manual can cause unexpected accidents. Ask Komatsu or your Komatsu distributor to repair.

WARNING TAG

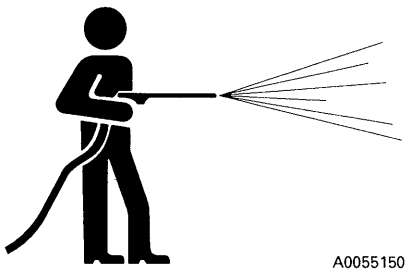
- ALWAYS attach the WARNING TAG to the control lever in the operator's cab to alert others that you are working on the machine. Attach additional warning tags around the machine, if necessary.
- If others start the engine or operate the controls while you are performing service or lubrication, you could suffer serious injury or death.
  Part No. 09963-03000





CLEANING BEFORE CHECKING AND MAINTENANCE

- Clean the machine before checking and maintenance and let dust enter inside the machine, then carry out the maintenance safely.
- When carrying out checking and maitenance with leaving the machine dirty causes the detection of failure parts to be difficult, furthermore dust or mud get into your eyes or the machine turn over, as a result, it may lead to injury.
- Follow these instructions when cleaning the machine.
  - Put on shoes with creepers to avoid slipping and falling by getting wet on the floor.
  - When using high pressure car washer, put on protective clothing, spectacles and so on. Protect from cutting skin by being splushed high pressure water and from getting mud into your eyes.
  - Do not splash water directly to the electric system (sensors, connectors). If water enter into the electric system, their operation will failure, and it causes mulfunction.



ARRANGING AND CLEANING

Keep work space neat and clean. Put tools away properly. For safety wipe grease and oil off tools. Putting out of order can cause injury by stumbling or slipping and falling.

FOLLOW THE INSTRUCTOR WHEN GROUP WORKING

When repairing the machine and removing and mounting the work equipment, select a person charge of instruction, and have everyone follow him. When working in a group, unexpectrd accidents may occur by members working at cross-purpose.



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PROPER TOOLS

Do not use damaged or worn tools other than the purpose of using. Use only tools suited to the task. Using damaged, low quality, faulty, or make shift tools could cause personal injury.

Tools → See "20.1 INTRODUCTION OF NECESSARY TOOLS".

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

The hoses of the fuel system, hydlauric system and break are important tools, and it is necessary to periodical check for safety. The expertness is neccesary for replacing of them. Contact to the Komatsu or the Komatsu distributor when replacing them.

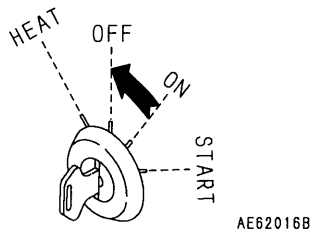
- Replace these components periodically with new ones, regardless of whether or not they appear to be defective. These components deteriorate over time and that causes fire by oil leaks or damage to the work equipment.

- Replace or repair any such components if any defects are found, even though they have not reached the time specified.

Replacement of safety critical components → See "21. PERIODIC REPLACEMENT OF SAFETY CRITIVCAL PARTS".

STOP THE ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

- Always stop the machine on firm flat ground and stop the engine before carrying out inspection and maintenance.
- If it is necessary to run the engine when carrying out maintenance, such as when cleaning the inside of the radiator, apply the locks to the work equipment control levers, and always carry out the operations with two workers.
- One worker should sit in the operator's seat so that he can stop the engine immediately if necessary. He should also be extremely careful not to touch any lever by mistake. Touch the levers only when they have to be operated.
- The worker carrying out maintenance should be extremely careful not to touch or get caught in the moving parts.



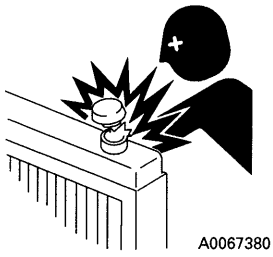
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PREVENTIVE ACTION OF FALLING OF THE WORKING EQUIPMENT

Set the boom hoist control lever to neutral and lock the lever lock knob to prevent from the boom falling. Do not put feet on the boom telescope pedal.

RADIATOR WATER LEVEL

- Carry out checking the water level by the sub-tank after stopping the engine, and wait for the engine and radiator to cool down. Normally, do not open the radiator cap.
- When the sub-tank is not installed or when the radiator cap must be removed, do the following:
  - Wait until the water level has dopped and is stable, then check the water level. (When watching the water temperature cooling down, put your hand near the engine and the radiator (but do not touch), and confirm the temperature level by the ambient temperature.)
  - To release the internal pressure before removing the radiator cap, loosen the radiator cap slowly and let the pressure escape.


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USE OF LIGHTING

- When checking fuel, oil, coolant, or battery electrolyte, always use lighting with anti-explosion specifications.
  If such lighting equipment is not used, there is danger of explosion.
- Working in a dark place without lighting causes injury. Always use lighting.
- Do not use a cigarette lighter instead of proper lighting equipment. There is danger of fire and explosion due to the battery gas catching fire.
- When removing the power souce from the machine body, follow the instructions in this manual.



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PREVENTING FIRE

When carrying out maintenance, inflammable things such as fuel and battery may be handled, so follow the instructions as follows.

- Inflammable greases and fuel must be apart from fire.
- Use uninflammable cleaning oil of parts and do not use inflammable oil such as gas oil and gasoline.
- Do not carry out checking while smoking. Smoke at a certain place.
- When checking fuel, oil, coolant, or battery electrolyte, always use lighting with anti-explosion specifications.
- Do not use a cigarette lighter or match instead of proper lighting equipment.
- Move inflammable things to a safe place when grinder working or welding the machine body.
- Check that there is a fire extinguisher near the inspection or maitenance area.



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8.2 DURING MAINTENANCE

PERSONNEL

Only authorized personnel can service and repair the machine. Extra precautions should be taken when grinding, welding, and using a sledge-hammer.

PRECAUTIONS FOR REMOVING, MOUNTING AND STORAGING ATTACHMENTS

- Put a person in charge before removing and mounting attachments.
- Keep people away from the machine and attachments.
- Place attachments that have been removed from the machine in a safe place so that they do not fall. If they fall on you or others, serious injury could result.



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WORK UNDER THE MACHINE

- Park the machine on level and rigid ground.
- Always lock wheels.
- When extending the outriggers, make sure to support the machine by inserting blocks under the machine. If the support can not be secured, never work under the machine.

PRECAUTIONS WHEN WORKING OF THE MACHINE

- When working on the machine, keep the footing clean and follow the instructions so as not to fall.
  - Do not spill oil and grease.
  - Do not scatter tools.
  - Watch your footing when walking.
- Never jump off. When going up and down, always use the footstool and the handrail, and keep the body with more than 3 points, hands and foots (both foots and one hand, or both foots and one hand) securely for safety.
- Wear proper protective gear according to the job.

LOCKING THE CHECKING COVER

When carrying out maintenance leaving the checking cover opened, make sure to lock the lock cover, or it may injury by the door being closed with a gust of wind.

MORE THAN TWO PERSONS CARRY OUT MAINTENANCE DURING ENGINE OPERATES

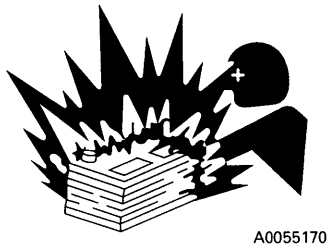
Do not carry out maintenance during engine operates to prevent accidents occuring. If it is neccesary to carry out the maintenance during engine operates, follow the instructions.

- One person sits at the operator's seat and prepares to start the engine at any time, and keeps in contact with the other.
- When working near the movable parts, pay special attention not to be caught in them.
- Do not touch the control lever. If it is neccesary to operate the control lever, always make a sign to move to the safe place.
- If your body or tools touch the fan blades or fan belt, they may be cut, so never touch any rotating parts.

REMOVING BATTERY TERMINAL

- When repairing the electrical system or when carrying out electrical welding, remove the negative ⊖ terminal of the battery to stop the flow of current.

  Using of battery → See "15.2 If battery is discharged".



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WHEN DETECTING ABNORMALITY DURING CHECKING

- If abnormalities are detected during checking, always repair them. Especially, ignoring failures of the break system and work equipment will cause injury.
- According to the failure, contact Komatsu or the Komatsu distributor.

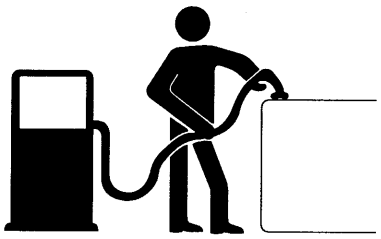
RULES TO FOLLOW WHEN ADDING FUEL OR OIL

Fuel and oil can catch fire, so observe follow.

- Stop the engine when adding fuel or oil.
- Do not smoke.
- Spilled fuel and oil may cause you or others to slip, so always wipe it up immediately.
- Always tighten the cap of the fuel and oil fillers securely.
- Always add fuel and oil in a well-ventilated place.



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HANDLING HIGH-PRESSURE HOSES

- If fuel or oil leaks from high-pressure hoses, it may lead a fire or causes injury by operation failure. When the damage of the hoses and looseness of the bolts are found, stop working and contact Komatsu or your Komatsu distributor.
- Expertness is neccesary for replacing the high-pressure hoses, and the tightening torque is fixed according to the type and the size of the hoses. Do not repair them unless you are qualified to do so.

PRECAUTIONS WITH HIGH PRESSURE OIL

When checking and replacing high pressure hoses, make sure that the pressure of the oil pressure circuits is released, or it may cause injury. Follow the instructions.

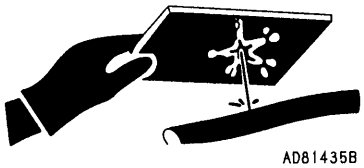
- Replacement of high pressure hoses requires high skill. This work must only be done by Komatsu-approved repair personnel.
- See "STOP THE ENGINE BEFORE CARRYING OUT INSPECTION AND MAITENANCE" IN "8.1 BEFORE CARRING OUT MAINTENANCE". Do not carry out inspection and maintenance before releasing the pressure.
- Always wear safety glasses and thick gloves.
- If there is leakage from the pipes and hoses, they and the surrouding will be wet. Check the cracks of the pipes and the crevices and the distention of the hoses. If it is difficult to find them, contact Komatsu or your Komatsu distributor.
- If you are hit by a jet of high-pressure oil, consult a doctor immediately for medical attention.

INCORRECT



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PRECAUTIONS WHEN CARRYING OUT MAINTENANCE AT HIGH TEMPERATURES OR HIGH PRESSURE

Immediately after stopping operations, the engine cooling water, oil at all parts, exhaust manifold and muffler are at high temperatures and under high pressure.
In this condition, if the cap is removed, or the oil or water are drained, or the filters are replaced, this may result in burns or other injury. Wait for the temperature to go down, then carry out the inspection and maintenance in accordance with the procedures given in this manual.

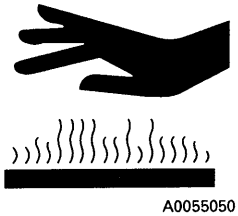
Cleaning inside or cooling system
→ See "23.2 WHEN REQUIRED".

Checking cooling water level, hydraulic oil level
→ See "23.3 CHECK BEFORE STARTING".

Checking lubricating oil level, adding oil
→ See "23.3 CHECK BEFORE STARTING".

Checking transmission oil level, add oil
→ See "23.4 EVERY 50 HOURES SERVICE".

Changing oil, replacing filters
→ See "23.6 – 9 PERIODIC MAINTENANCE".

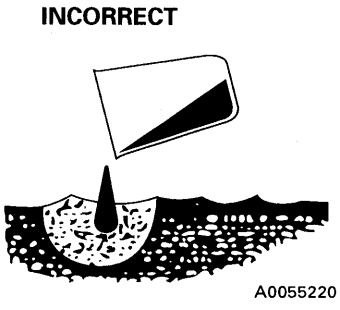


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WASTE MATERIALS

To prevent from environmental pollution, follow the instructions below.

- Never dump waste oil in a sewer system, rivers, etc.
- Always put oil drained from your machine in containers. Never drain oil directly on the ground.
- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters, batteries, and others.



NEVER DROP TOOLS AND PARTS INSIDE THE MACHINE

- When checking with the inspection windows or the oil filter opened, do not drop the bolts, nuts and tools inside the machine, as this will cause malfunction of the machine and accidents may occur. If tool or parts are dropped, always pick them up.
- Do not put things other than neccesary tools in your pockets.

PRECAUTIONS WHEN USING A HAMMER

When carrying out maintenance, wear safety glasses or safety cap, and put a brass bar between the hammer and the object when hitting. When hitting the hard parts such as pin and bearing, the broken pieces of them may fly into your eyes.

PRECAUTIONS WHEN WELDING

Carry out the welding at well-equipped facility and only by authorized persons. Unauthorized person can never carry out the welding because the gas may generates and there is a fear of a fire and an electric shock when welding. Follow these instructions.

- Remove the battery terminal to avoid explosions.
- Strip the paint off the welding area to avoid the generation of the gas.
- Do not heat the hydlauric pressure equipment and the pipes or near to them because the flammable steam or atomizing will be generate and there is a danger of catching fire.
- Apply a fire preventing cover over the pressurized pipes or the rubber hoses because they can be cut suddenly.
- Wear safety clothes.
- Well-ventilate the room.
- Remove flammable things and prepare a fire distinguisher.

CONFIRMATION AFTER CHECKING AND MAITENANCE

Failure to confirm that there is no omission of checking and maintenance and the function of the serviced area can cause the unexpected accidents, and it may lead injury. Follow the instructions below.

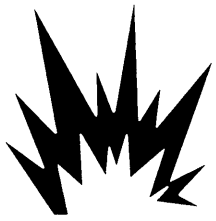
- Check the engine has stopped.
- Confirm whether there is any omission of checking or maitenance.
- Confirm whether checking and maintenance are completed correctly.
- Check whether the tools and the parts are dropped. Especially it is very dangerous if they are inside the machine or the linkage mechanism.
- Check whether there are water leaks, oil leaks, and if all bolts have been tightened.
- Confirmation when the engine started.
- When starting the engine, see "WHEN MORE THAN TWO PERSONS CARRY OUT MAINTENANCE DURING ENGINE OPERATION" and maintain safety fully.
- Check whether the operation of the checked and service area is normal.
- Check for oil leaks when operating the work equipment with the engine at high-revolutions.

8.3 TIRES

HANDLING TIRES

Use specified tires, and follow tire inflation pressure and handling. If tires are not used under the specified conditions, they may overheat and burst or be cut and burst by sharp stones on rough road surfaces. This may lead toserious injury or damage.
To maintain safety, always keep to the following conditions.

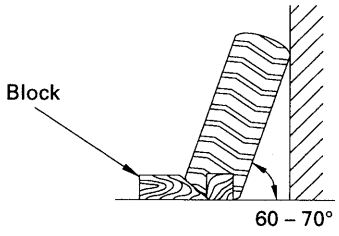
- Use specified tire and follow inflation pressure.
  Suitable inflation pressure → See "12.1.2 CHECK BEFORE STARTING".
- When inflating the tires, use the air chuck with clip. Keep away from the side of tires because the wheel parts will scatter during inflating.
- Do not adjust the tire inflation pressure just after the high-speed traveling and the high-load working.
- Lighting fires or carrying out welding operations near the wheel or tire.
- Carrying out maintenance (disassembling, repairing, assembling) needs the exclusive equipments and the technical knowledge, always consult your Komatsu distributor or tire maker.



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STORING TIRES AFTER REMOVAL

- As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter. If the tires are stored outside, always erect a fence around the tiresand put up "No Entry" and other warning signs that even young children can understand.
- Stand the tire on level ground, and block it securely so that it cannot roll or fall over. Turning tires sideways causes collapse.
- If the tire should fall over, get out of the way quickly. The tires for construction equipment are extremely heavy, so trying to hold the tire may lead toserious injury.



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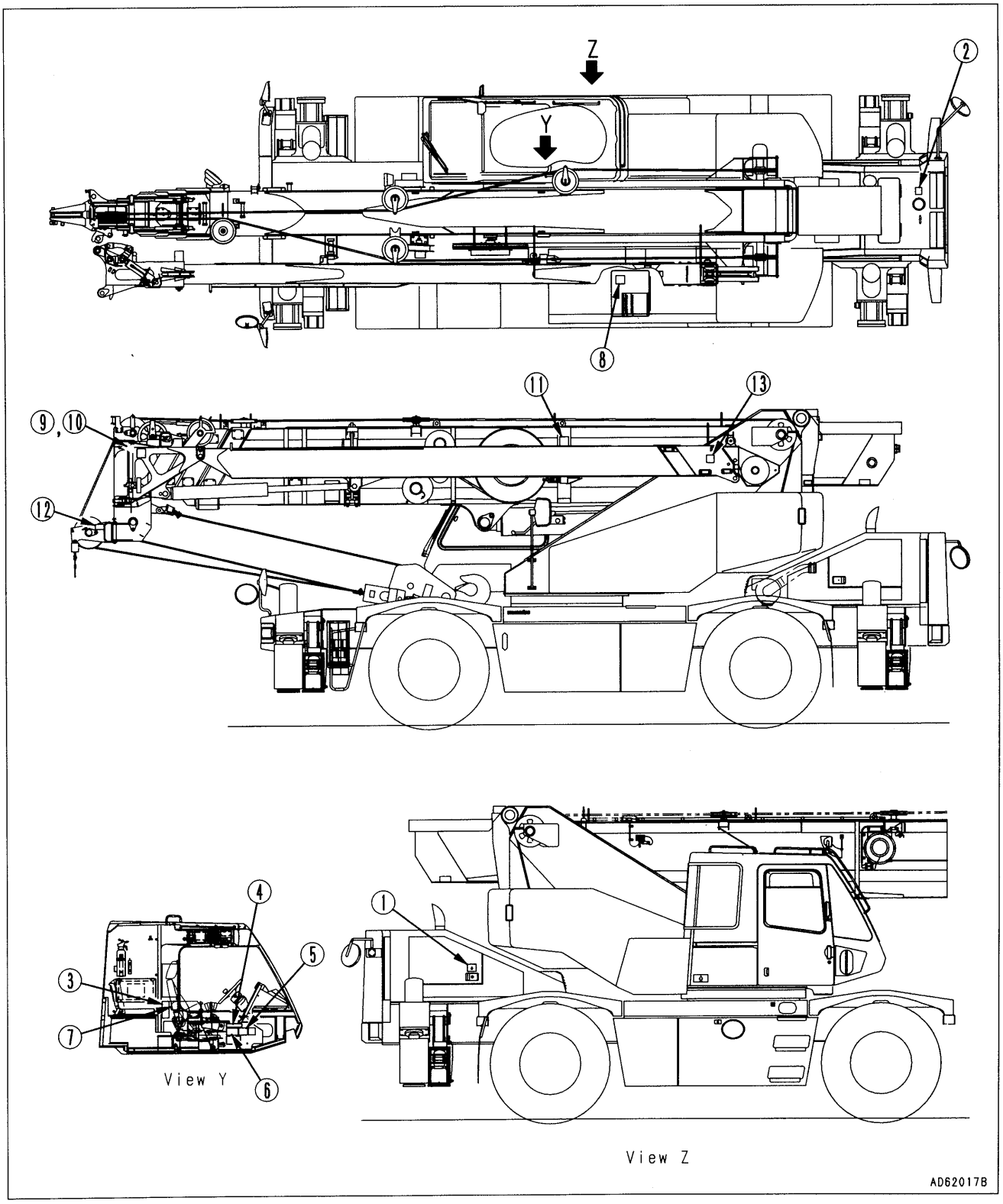
9. POSITION FOR ATTACHING SAFETY LABELS

Always keep these labels clean. If they are lost or damaged, attch them again or replace them with new labels.

There are other labels in addition to the safety labels listed as follows, so handle them in the same way.

Safety labels may be available in languages other than English. To find out what labels are available, contact your Komatsu distributor.

9.1 POSITION FOR ATTACHING SAFETY LABELS



1. Precautions while engine is running

WARNING

While engine is running:

- Do not open cover.
- Keep away from fan and fan-belt.

After stopping engine, Do not touch engine or related parts such as muffler since they are very hot.

2. Precautions for hot coolant

WARNING

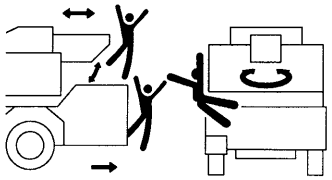
Hot water hazard.

To prevent hot water from spurting out:

- Turn engine off
- Allow water to cool
- Slowly loosen cap to relieve pressure before removing.

3. Precautions for forwarding and reversing the machine

WARNING



To prevent SEVERE INJURY or DEATH, do the following before moving machine or its attachments:

- Honk horn to alert people nearby.
- Be sure no one is on or near machine or in swing area.
- Use spotter if view is obstructed.
- When retracting, RAISING or LOWERING SECOND BOOM, Make sure that there is no one at rear of BASE BOOM.

Follow above event if machine equipped with travel alarm and mirrors.

4. Precautions when canceling the moment limiter

WARNING

Do not release the moment limitation (o. s. s.) auto-stop switch while working. Otherwise, falling, overwinding or damage to construction may occur.

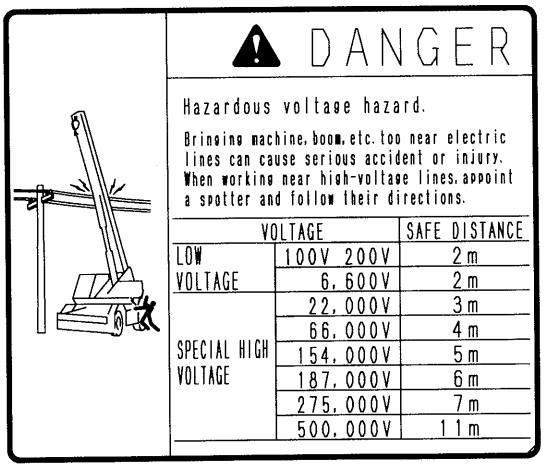
5. Precautions when operating outriggers

WARNING

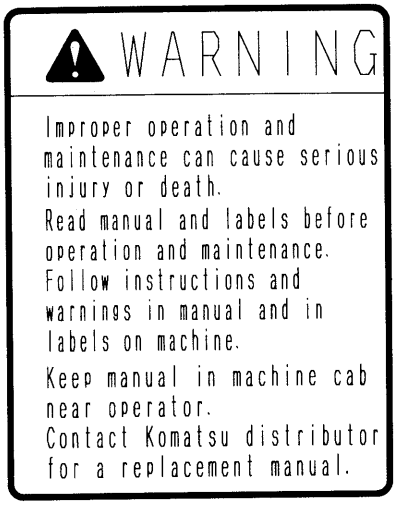
When operating outriggers, be sure to observe following precautions since turning of vehicle can cause serious accident.

- Confirm that ground is solid. if it is soft, use proper base wood blockes to keep vehicle holizontal.
- After setting outriggers, confirm that wheels are floating above ground.
- When extracting outriggers, be sure to insert lock pins.
- When extracting outriggers, push setting button on oss panel in operator's cab to confirm their setting.

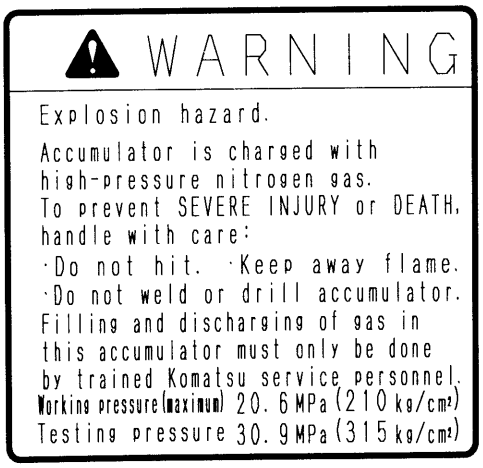
6. Precautions for high voltage



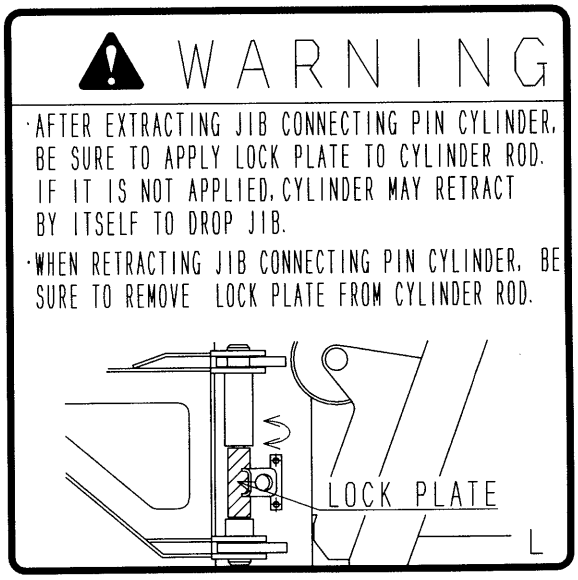
7. Precautions when operating and carrying out maintenance



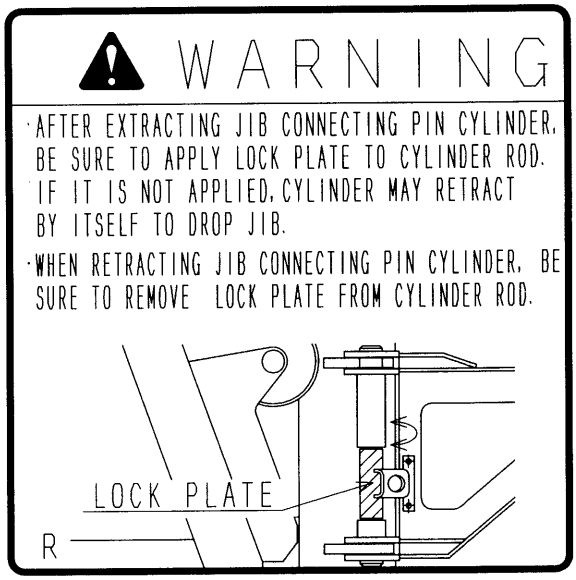
8. Precautions when handling an accumulator



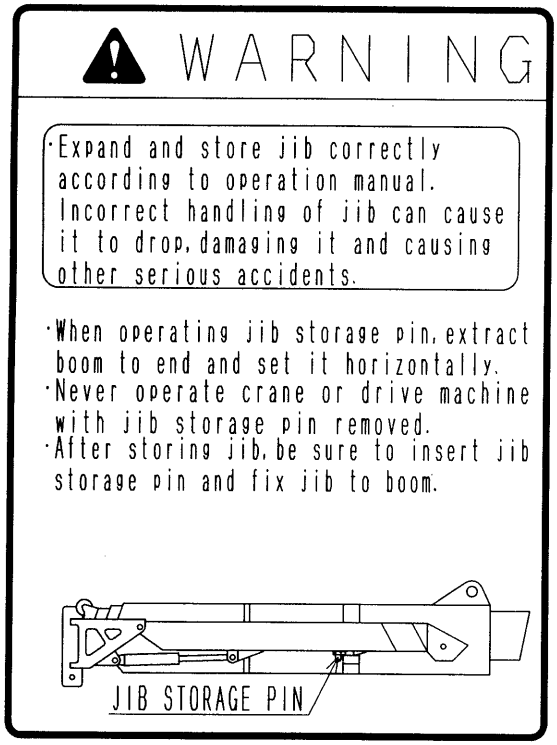
9. Precautions when telescoping jib connecting pin cylinder (Left side)



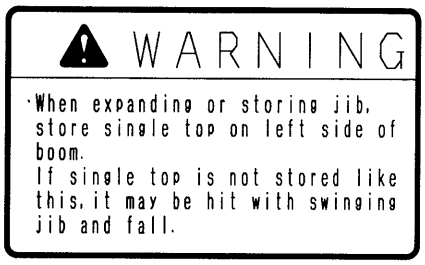
10. Precautions when telescoping jib connecting pin cylinder (Right side)



11. Precautions when expanding and storing jib



12. Precautions when storing single top with jib expanded or stored



13. Precautions when expanding second job.



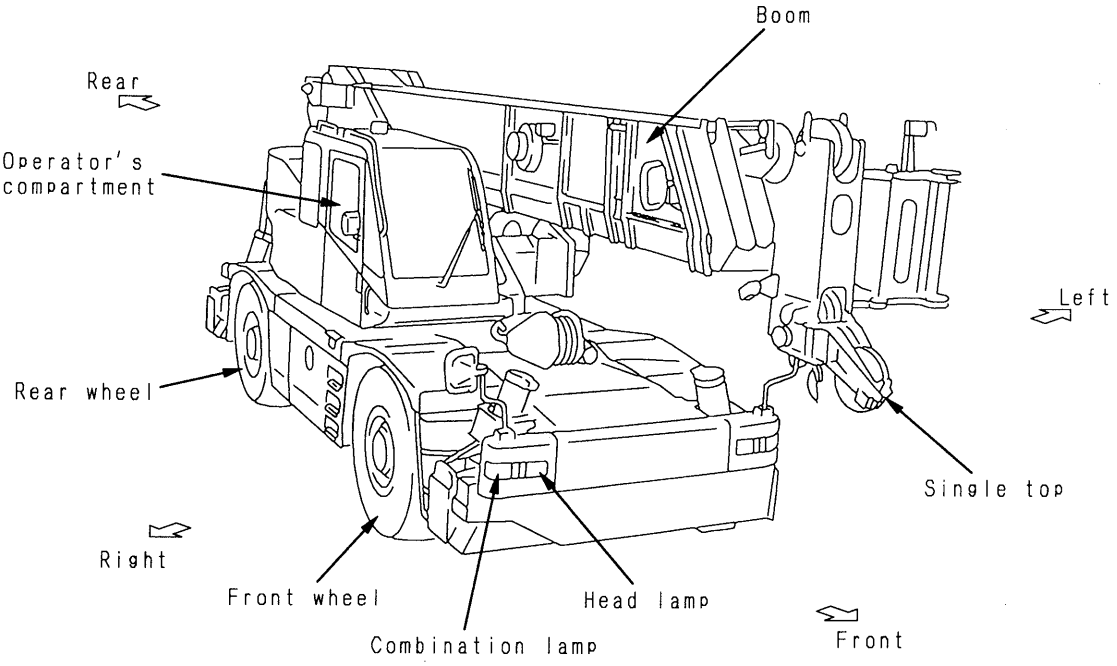
For safety labels 1 through 8, please request as Part No. 23S-V11-5110.
For safety labels 9 through 13, please request as Part No. 23S-V11-5350.

OPERATION

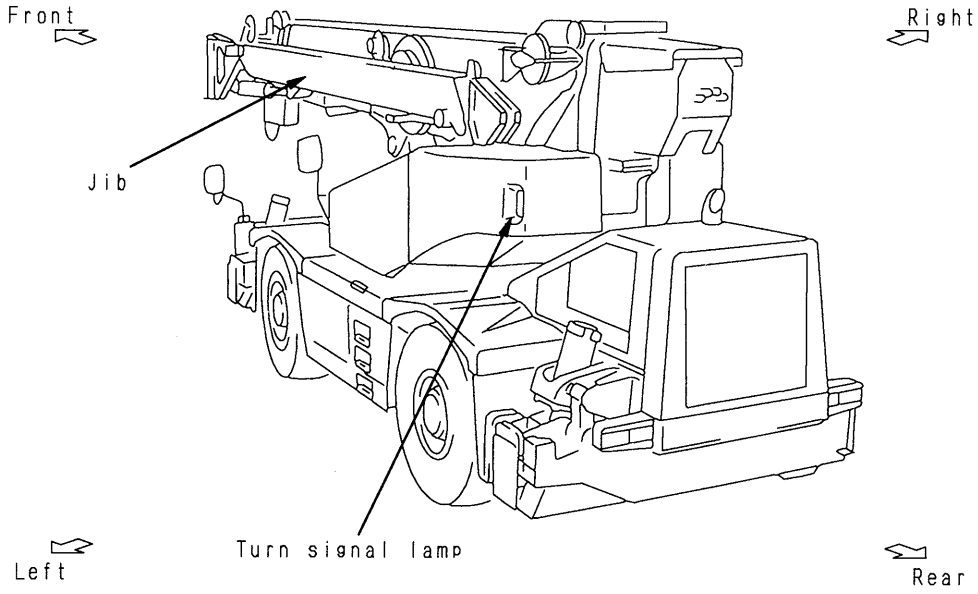
10. GENERAL LOCATIONS

10.1 GENERAL VIEW OF MACHINE

If directions are indicated in this section, they refer to the directions shown by the arrows in the diagram below.



AE60100B

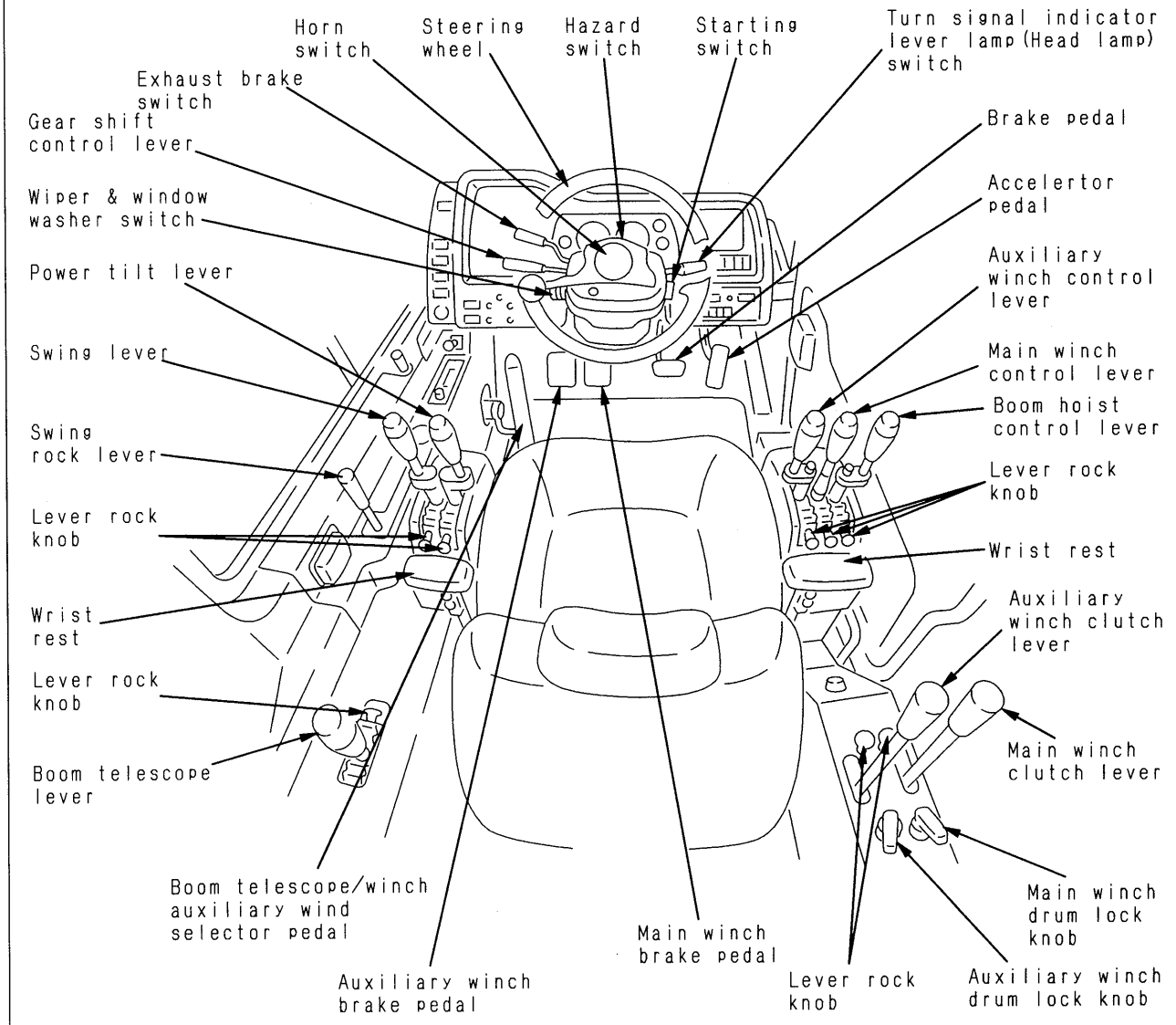


AE60101B

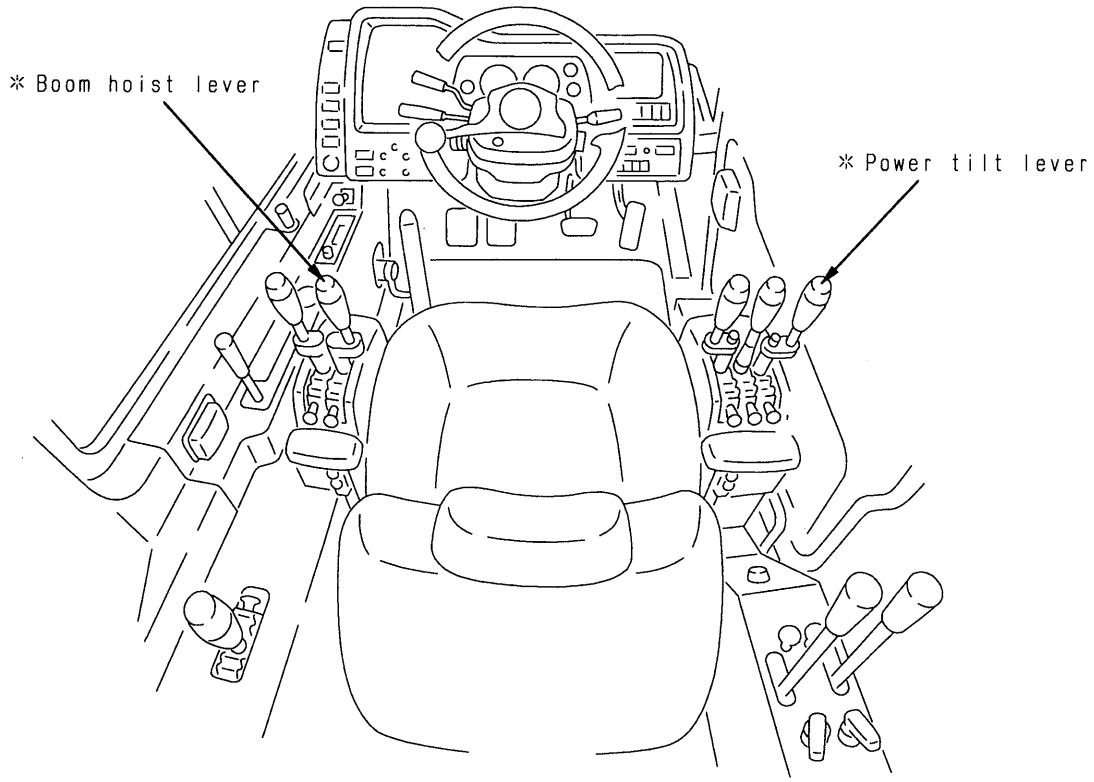
10.2 GENERAL VIEW OF CONTROLS AND GAUGES

10.2.1 GENERAL VIEW OF OPERATOR'S COMPARTMENT

ISO pattern



KOMATSU pattern

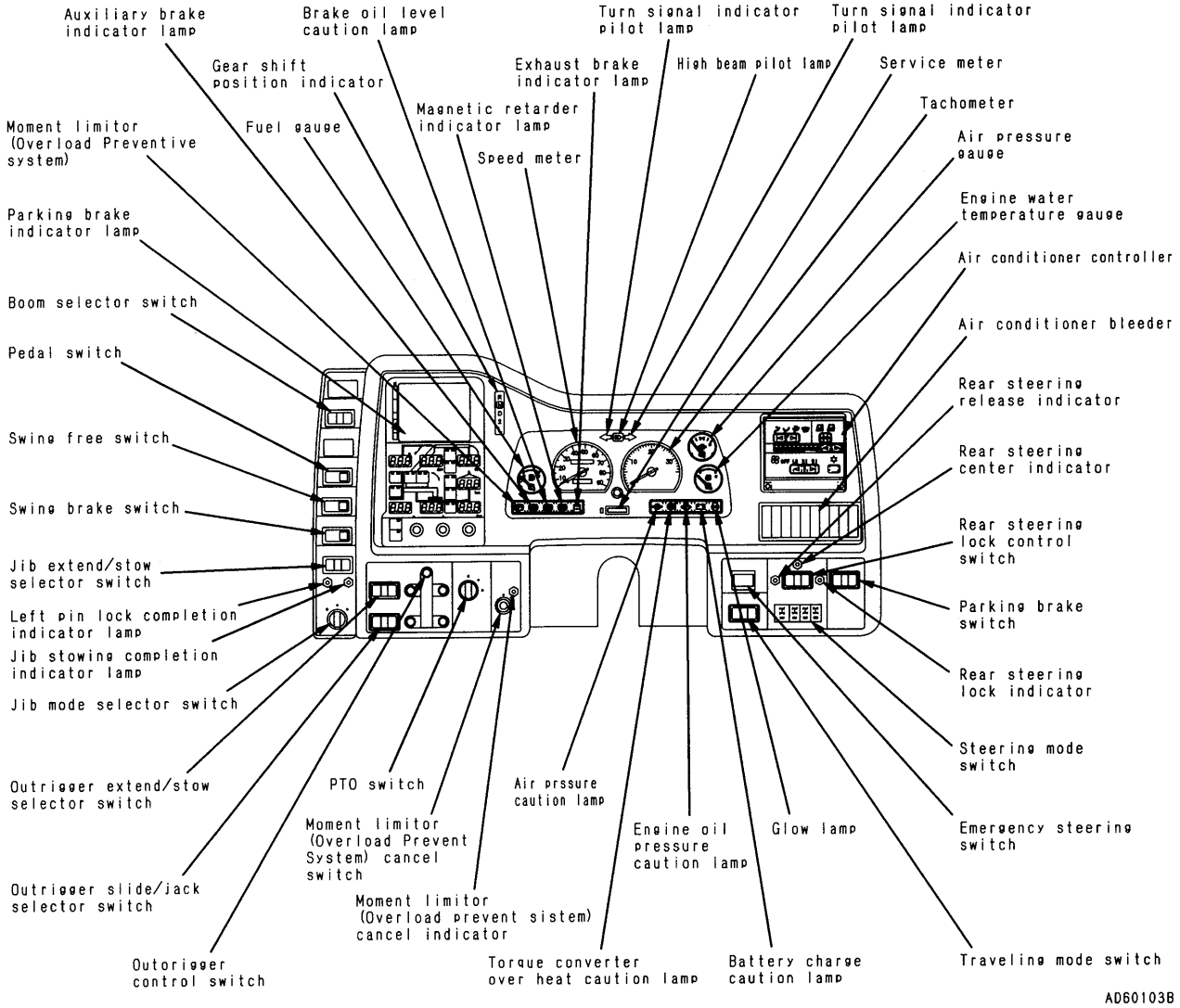


AE62262B

This general view of operator's compartment differs only in the ISO pattern and in the position of the lever marked *.
Other elements are the same.

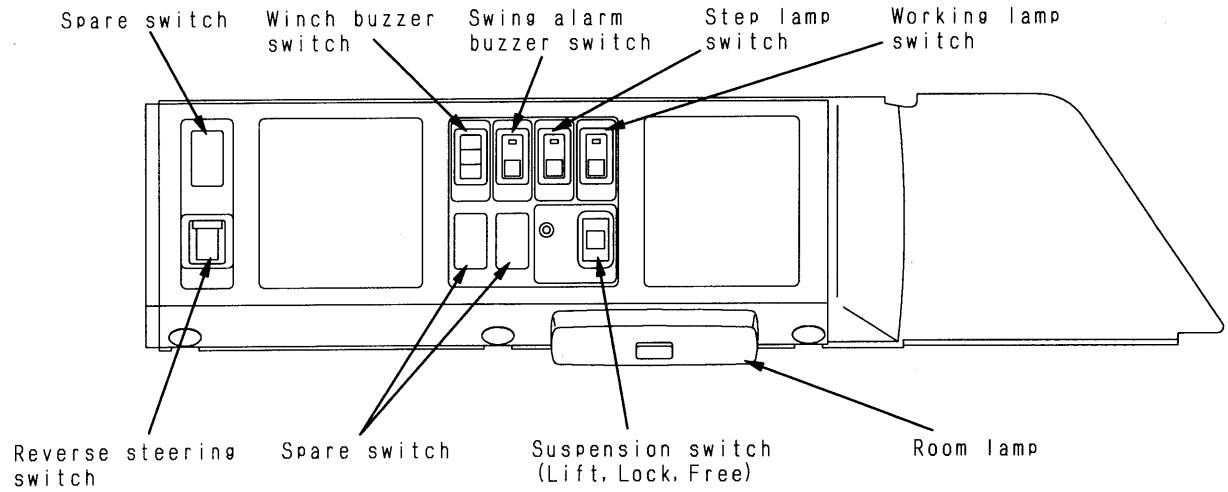
10.2.2 FRONT PANEL, TOP PANEL

Front panel



AD60103B

Top panel

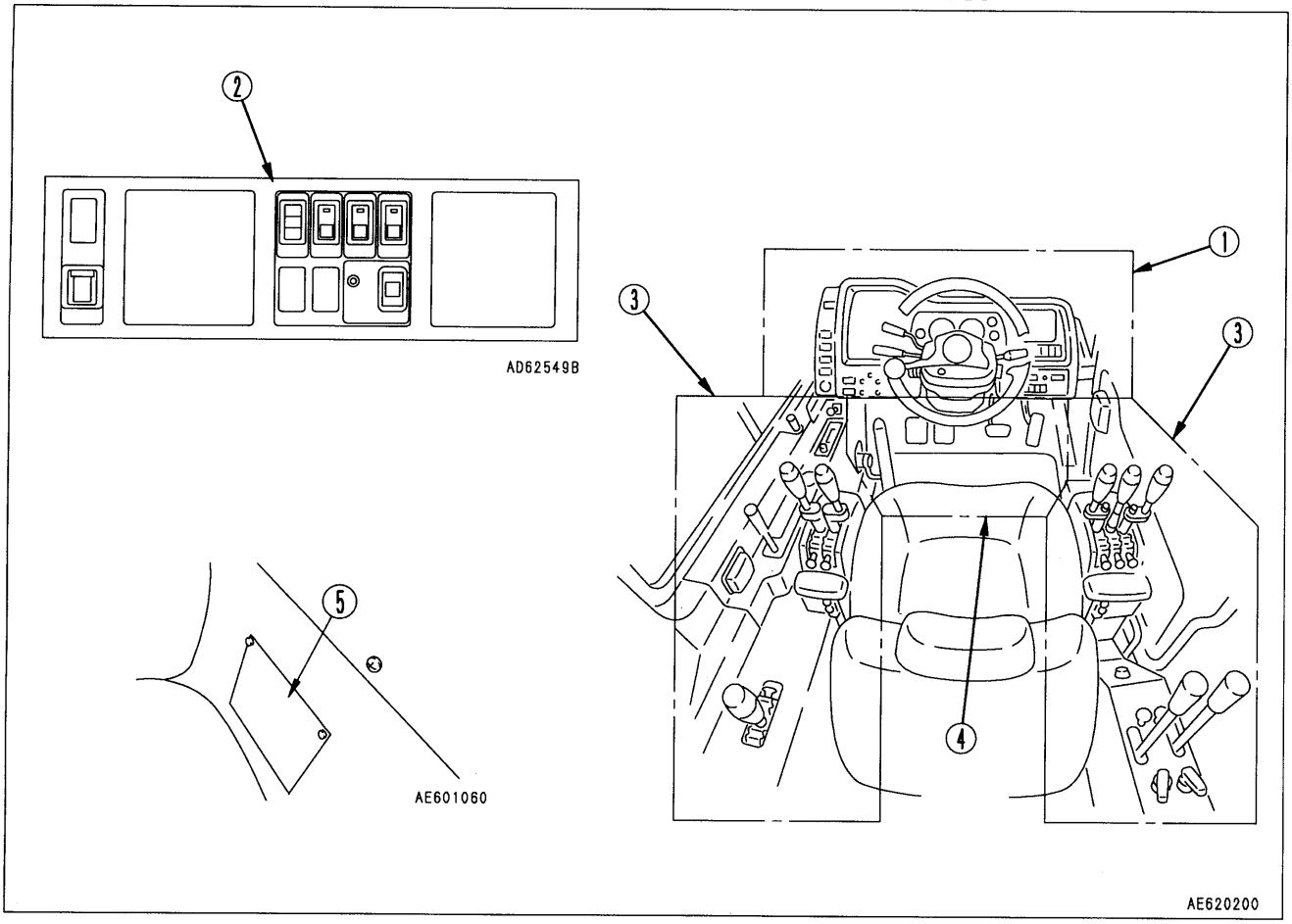


AD62548B

11. EXPLANATION OF COMPONENTS

The following is an explanation of devices needed for operating the machine.
To carry out suitable operations correctly and safely, it is important to fully understand the methods of operating the equipment and the meanings of the displays.

11.1 OUTLINE OF INSIDE OF OPERATOR'S COMPARTMENT



The controls inside the operator's compartment consist of the following five groups.

1. FRONT PANEL GROUP
This includes the monitors, MOMENT LIMITER (Overload Preventive System), meters, outrigger control switch and switches.

2. TOP PANEL GROUP
This includes the working lamp, step lamp, suspension lock, list switch, rear steering switch.

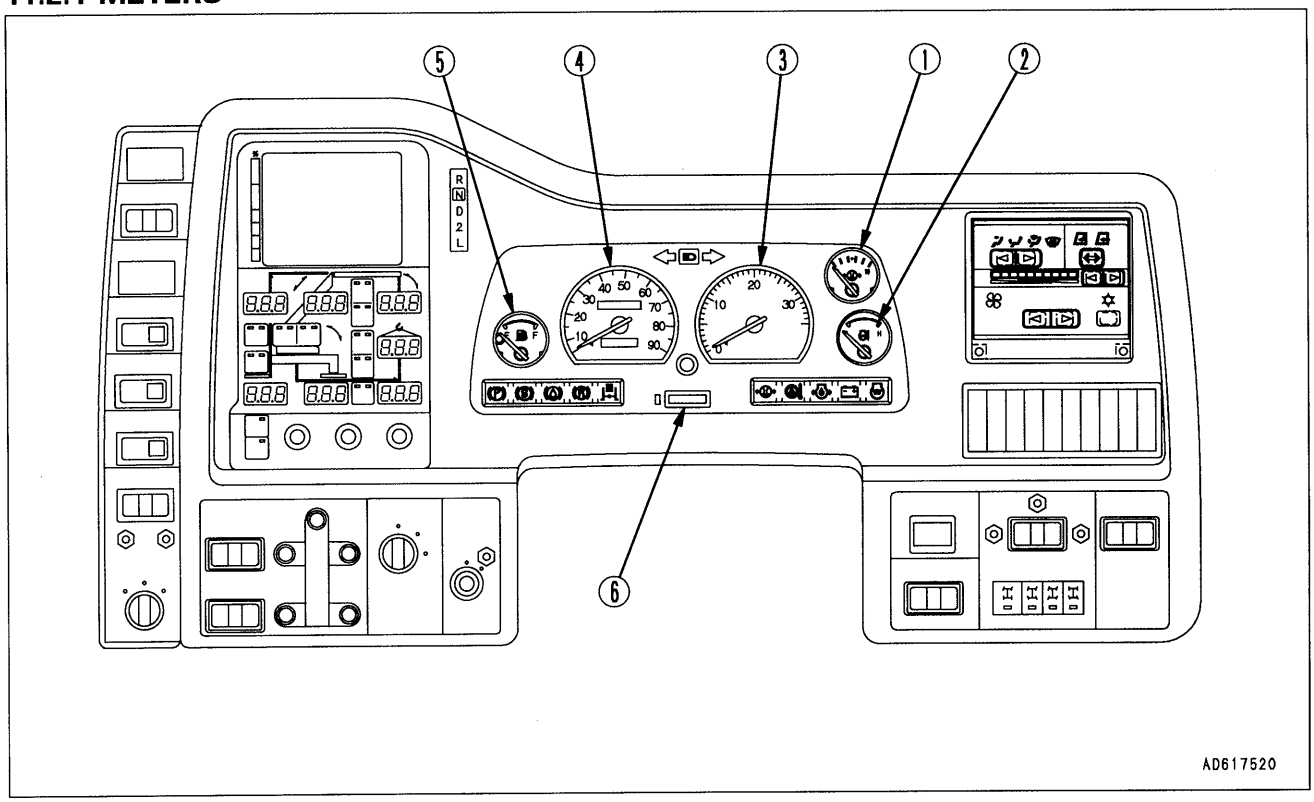
3. SIDE PANEL GROUP
This includes the work equipment control levers, car radio and spirit level.

4. PEDAL GROUP
This consists of the brake pedal, accelerator pedal, winch pedals, and work equipment pedals.

5. LEFT REAR COVER GROUP (FUSE INSPECTION COVER)
This includes the emergency gear shift selector switch, the emergency gear shift switch, and fuses.

11.2 FRONT PANEL GROUP

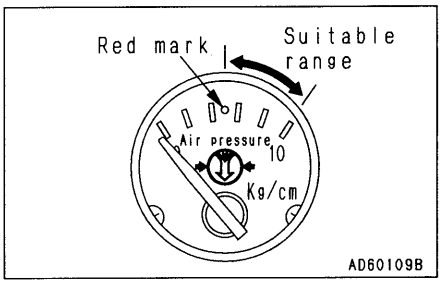
11.2.1 METERS



AD617520

1. AIR PRESSURE GAUGE

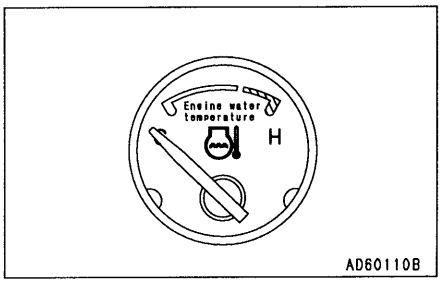
This indicates the air pressure inside the air tank.
When the indicator is in the range indicated by the arrow during operation, the air pressure is normal.
If the air pressure is below the range indicated by the arrow during operation, an alarm buzzer will sound, and the air tank pressure monitor lamp will light up. If this happens, stop the machine, run at high idling, and wait for the indicator to enter the range indicated by the arrow.



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2. ENGINE WATER TEMPERATURE GAUGE

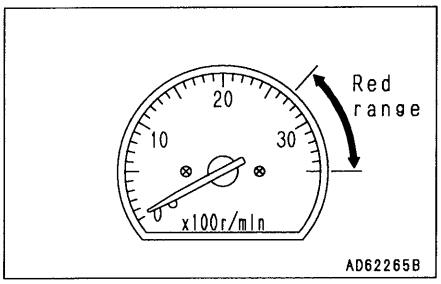
This gauge indicates the cooling water temperature.
When the indicator is in the white range during operation, the water temperature is normal. If the indicator moves into the red range during operation, stop the engine, run the engine at low idling, and wait for the indicator to go back to the white range.



AD60110B

3. TACHOMETER

This indicates the number of revolutions of the engine per minute.
Red range: This indicates that the engine is overrunning.
White range: This is the normal range for use.

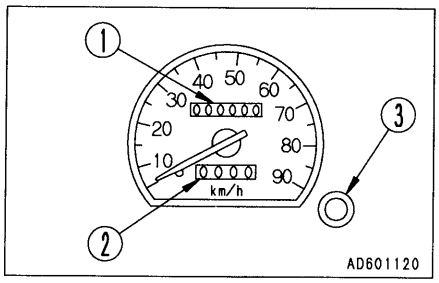


AD62265B

4. SPEEDOMETER

This indicates the speed at which the machine is traveling.
The speedometer includes an odometer ① and trip meter ②.
Odometer ① indicates the total distance traveled by the machine in kilometers.

Trip meter ② can be used if you want to know the distance traveled over a certain stretch or period of time. The white numerals show kilometers, and the black numeral shows 100 meters.
Press reset button ③ to return the meter reading to 0.

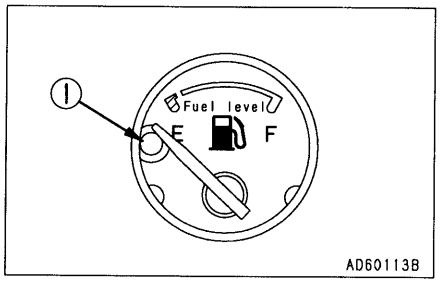


AD601120

5. FUEL GAUGE

This indicates the amount of fuel remaining in the fuel tank.
E: Empty
F: Full

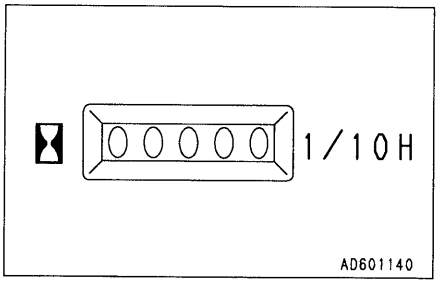
If fuel warning lamp ① lights up during operation, check the fuel level and add fuel as soon as possible.



AD60113B

6. SERVICE METER

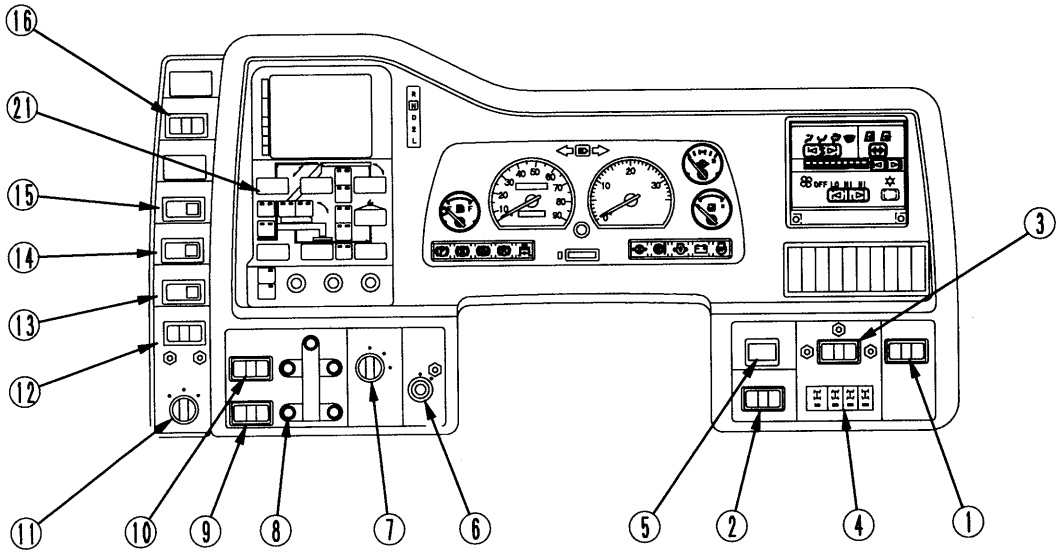
This shows the total number of hours that the machine has worked.
Use this display to set the interval for periodic maintenance.
The service meter advances while the engine is running even if the machine is not moving.
The meter show the hours and the black numeral shows 1/10 hours.



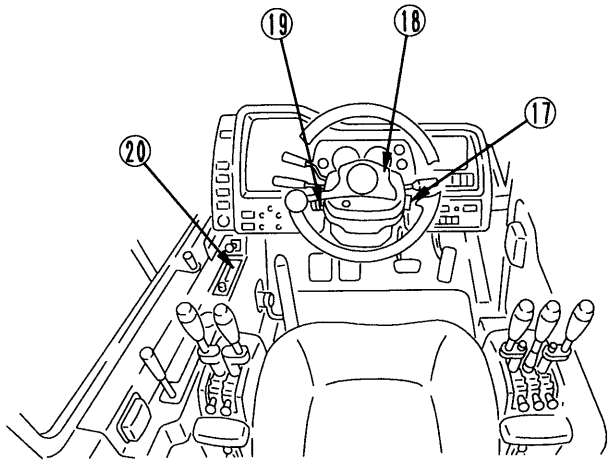
AD601140

The white numeral will advance by 1 for every hour that the engine is running, regardless of the engine speed.

11.2.2 SWITCH



AD62021B

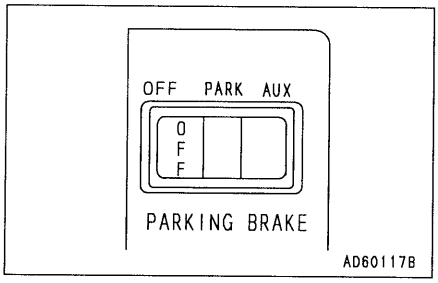


AD620220

⚠ WARNING

Some switch possess the night light internally which lights up by interlocking with the low or light positions of the light switch.
Here, only the names of the switches are shown, but operational directions and positions (for example, ON and OFF) are not indicated.
In spite of the operational directions and positions, these internal lights light up by interlocking with the low or the light. Concerning the operational directions and positions, follow the indications of the decals near the switches.

1. PARKING BRAKE SWITCH



⚠ WARNING

- **If the starting switch is turned OFF when this switch is at the auxiliary brake position, only the parking brake is applied.**
- **When parking the machine, always turn the switch to the parking brake position.**
- **Use the auxiliary brake only when on-tire stationary position of crane working. Do not use the auxiliary brake under other circumstances.**

This switch actuates the parking brake and auxiliary brake.

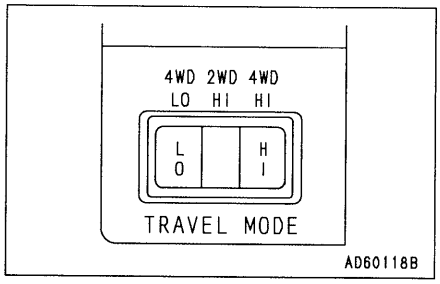
Auxiliary brake:	The parking brake and auxiliary brake (4 wheels) are actuated. Set the switch to this position for on-tire operations.
Parking brake:	The parking brake is actuated.
OFF:	The brake is released.

When the switch is actuated, the parking brake and auxiliary brake indicator lamps light up. When the switch is OFF, the character "OFF" inside the switch lights up, and when using the auxiliary brake, the character "AUX." inside the switch lights up.

REMARK

When lighting at night, "PARK. BRAKE" character portion of the switch lights up regardless of the position of the switch operation.

2. TRAVELING MODE SWITCH



⚠ WARNING

Stop the machine and set the gear shift lever to the N position, then depress the brake when operating the traveling mode selector switch. The traveling mode is not switched and the caution buzzer sounds although when traveling or operating the gear shift lever other than "N" (neutral).
Failure to follow the above operation will lead to breakage of the transmission select gear, so be extremely careful to follow the procedure correctly.

Switching the traveling mode selector switch allows you to select 3 types of the traveling modes.

1) 2WD Hi

When this switch is pressed, the drive is switched to 2-wheel drive and can travel at high speed. Use this switch on public roads.

2) 4WD Hi

When this switch is pressed, the drive is switched to 4-wheel drive and can travel at high speed. When this switch is pressed, the character "HI" lights up.

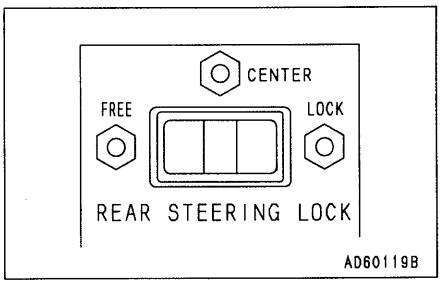
3) 4WD LOW

When this switch is pressed, the drive is switched to 4-wheel drive and can travel at low speed. Use this switch when traveling on soft ground or snow-covered roads in urban areas. On lifting load traveling, use this switch. When this switch is pressed, the character "LO" lights up.

REMARK

When lighting at night, "TRAVEL MODE" character portion of the switch lights up regardless of the position of the switch operation.

3. REAR STEERING LOCK CONTROL SWITCH



⚠ WARNING

- **Do not pull out the rear steering lock pin on public roads.**
- **Always stop the machine before operating the rear steering lock pin.**

1) LOCK OPERATION

For general travel operations, lock the rear wheel steering device mechanically.

When the switch is pressed, the lock pin goes down and the rear steering is locked.

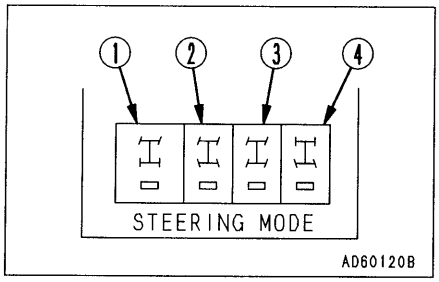
2) REAR STEERING LOCK CANCEL SWITCH

When this switch is pressed, the lock pin moves up and the lock is released.

REMARK

- Before operating switches 1 or 2, set the steering mode switch to the "Front 2-wheel drive" position.
  The lock switch is actuated only when the center (orange) indicator lamp for the rear steering lock is lighted up.
- When lighting at night, "R. ST. LOCK" character portion of the switch lights up regardless of the position of the switch operation.

4. STEERING MODE SWITCH



⚠ WARNING

- **When traveling on public roads, always travel in the front 2-wheel mode.**
- **Limit the special steering mode to the low-speed traveling in the yard.**
- **There is a mechanical characteristic that the depressed switch turns the other switches to OFF, and after that the depressed switch goes ON.**
  If the switch is not depressed securely, all four switches may enter the OFF status. Depress the switch securely until the indicator lights.

This switches between 2-wheel steering and 4-wheel steering.

① Front 2-wheel: Front wheel steering
Use this position for normal travel operations.
When this switch is pressed, the lamp (green) inside the switch lights up.

② 4-wheel: Coordinated steering of front and rear wheels
The minimum swing radius is decreased.
When this switch is pressed, the lamp (red) inside the switch lights up.

③ Crab: Crab steering of front and rear wheels
Use this position for approaching .
When this switch is pressed, the lamp (red) inside the switch lights up.

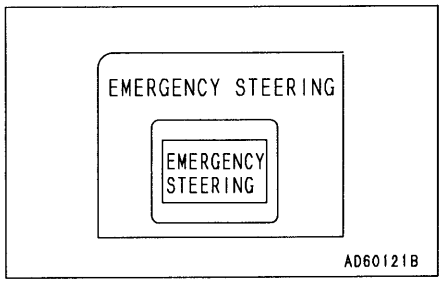
④ Rear 2-wheel: Rear wheel steering
Use this position when moving the rear body of the machine to the side.
When this switch is pressed, the lamp (red) inside the switch lights up.

REMARK

- The 4-wheel, crab, and rear 2-wheel steering modes are actuated only when the rear steering lock CANCELLED lamp (red) lights.
- Before operating the steering mode switch, stop the machine securely.
- Unless a steering mode is changed by depressing the steering mode switch, the lamp in the switch of the machine status lights up and the lamp in the depressed switch flashes.
  In this case, depress the steering mode switch of which lamp is lighting, and operate the steering mode switch again.
- When traveling in the 4-wheel, Crab, and Rear 2-wheel steering modes, travel at low speed.
- There are cases where the indicator light will not go unless the steering mode switch is depressed.
  In this case, "MDTU error EEA" may be indicated. When this happens, depress one time the steering mode switch of which the indicator lights, and depress the switch again.

5. EMERGENCY STEERING SWITCH

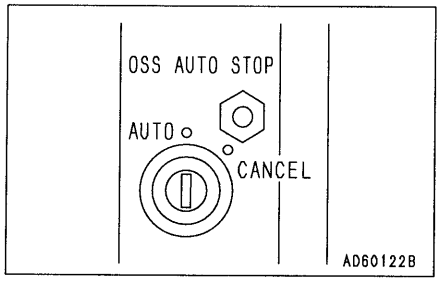
This switch actuates the emergency steering pump.
When the switch is pressed, the emergency pump is driven and the steering can be operated. When the switch is pressed again, the pump stops.



When the switch is ON, the pilot lamp (red) inside the switch lights up. When the night lighting is switched on, the switch lights up green when it is OFF.

The emergency steering pump can be used for a maximum of 5 minutes.
Move the machine quickly to a safe place beside the road and check the steering circuit.

6. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) CANCEL SWITCH



⚠ WARNING

During operations, there is danger of overwinding or the machine overturning, so this switch must not be used.

Use this switch to cancel the automatic stop function of the MOMENT LIMITER (Overload Prevention System) for inspection and maintenance. Do not use it for normal operations.
When the switch is at the CANCEL position, the indicator lamp (red) lights up (if equipped).

The automatic stop function is not canceled in the following cases.

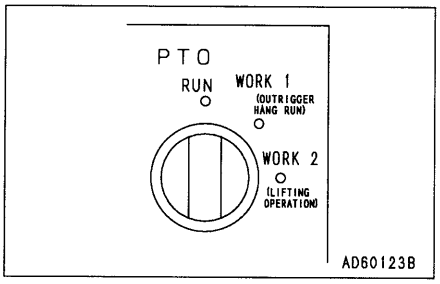
- When the work equipment lever stand is down.
- When in rear stabilizing automatic stopping.
  For details, see "Rear stabilizing stop".
- PTO switch is at "RUN" position.

7. PTO SWITCH

⚠ WARNING

Check that the work equipment control levers are at the neutral position before setting to the "WORK 1" or "WORK 2" positions.

This switch changes the travel condition and operating condition.



WORK 2: This is the position for general crane operations.
The outrigger and travel cannot be operated.

WORK 1: This is the position for outrigger operations and traveling with a raised load.
The work equipment, outriggers, and travel can be operated, but carry out the general crane working with "WORK 2".

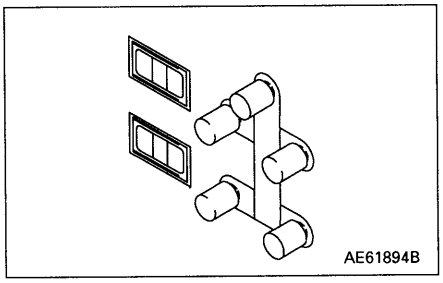
RUN: This is the position for normal travel operations.

	Operation	Outriggers	Travel
WORK 2	○	x	x
WORK 1	○	○	○
RUN	x	x	○

○: Possible
x: Impossible
Run the engine at low idling when operating the PTO switch.

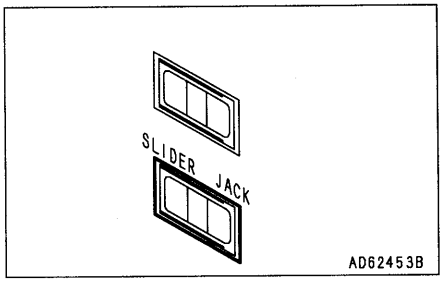
8. OUTRIGGER CONTROL SWITCH

This switch is used to operate the outriggers.



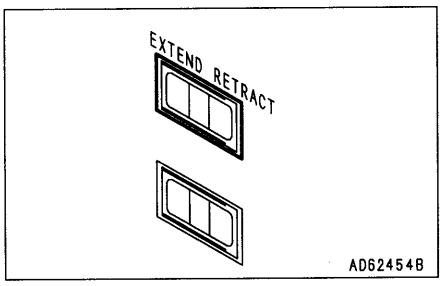
9. OUTRIGGER SLIDER/JACK SELECTOR SWITCH

This switch is used to select between slide and jack operations for the outrigger.
When this switch is pressed, "SLIDER" or "JACK" portion inside the switch lights up according to the switch position.



10. OUTRIGGER EXTEND/RETRACT SELECTOR SWITCH

This switch is used to select between extending and stowing the outrigger.
When this switch is pressed, "EXTEND" or "RETRACT" portion inside the switch lights up according to the switch position.



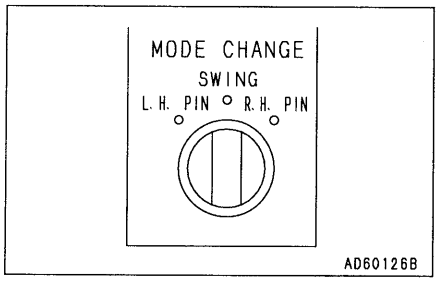
NOTICE

Do not operate the switches on both panels at the same time.

REMARK

- For switches (8), (9), and (10), set the PTO switch to the "WORK 1" position before operating.
- Switches (8), (9), and (10) are at 2 places: Inside the operator's compartment and on the left side of the machine.
  For details of the method of operation, see "12.17 OPERATING OUTRIGGER".
- After using, always return the SLIDER/JACK selector switch and EXTEND/RETRACT selector switch to the neutral position.
  If the PTO switch is at the "WORK 1" position but the outrigger EXTEND/RETRACT selector switch is not at neutral, indicator above the outrigger EXTEND/RETRACT selector switch will light up.
- If there is a fear to turn over backward when shortening the outrigger, it can not be operated. In this case, down the boom to traveling state before operating outrigger.
- When working at night, "OUTRIGGER" portion of the switch lights up regardless of the switch position.

11. JIB MODE SWITCH



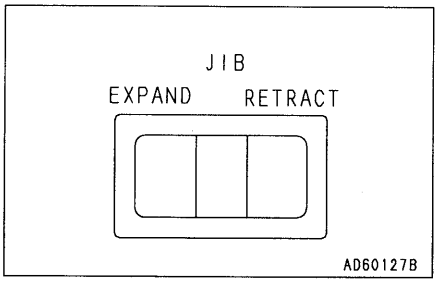
This switch is used to extend or stow the jib.

L.H PIN: When extending or stowing the jib, this is used to insert or remove the jib connection pin of the boom left side.

SWING: When extending or stowing the jib, this is used to swing the jib between the front and the side of the boom.

R.H PIN: When extending or stowing the jib, this is used to insert or remove the jib connection pin of the boom right side.

12. JIB EXPAND/RETRACT SWITCH



This switch is used to extend or stow the jib.

EXPAND: This is used to extend the jib at the position where the cylinder, that is selected by the jib mode switch, is extended.

JIB: (Neutral) This is the position where the jib is raised or lowered. Therefore, Left pin, Swing and Right pin cannot be operated.

RETRACT: This is the position where the cylinder, that is selected by the jib mode switch, is retracted. Therefore, this is used to stow the jib.

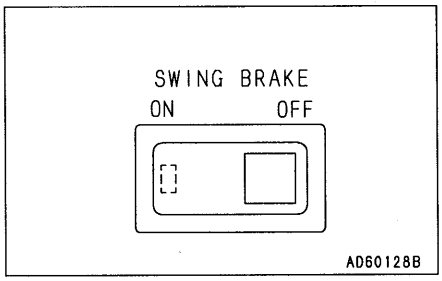
At regular time, set this switch to the jib (neutral).

When the PTO switch is set to "WORK 1" or "WORK 2" and the Moment limiter (overload prevention system) crane operating mode switch is set to "Procedure", "EXPAND" and "RETRACT" character (portions) in the switches lights depending on the switch positions. But, when working at night, "JIB" character portion of the switch lights regardless of the switch operation position.

REMARK

Switches ⑪, ⑫ do not operate unless the Moment limiter (overload prevention system) crane operating mode switch is set to "Procedure".
For details, see "12.32 HANDLING JIB".

13. SWING BRAKE SWITCH



This switch is used to lock the upper swing structure.

When the switch is set to the ON position, the upper swing structure is braked. And, the operation display (orange) in the switch lights. In addition, when working at night, "SWING BRAKE" character portion of the switch lights regardless of the switch operation portion.

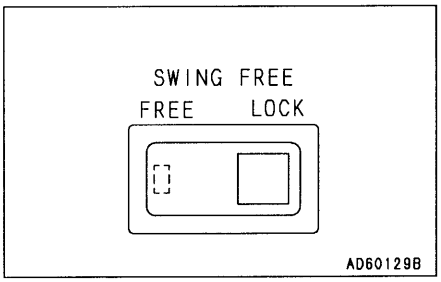
NOTICE

Use this switch when leaving the vehicle and folding the lifting load. Do not use this switch to brake the swing operation. When traveling with the load lifted, set this switch to the ON position.

REMARK

When the PTO switch is set to the travel position, the swing brake is automatically operated whether the swing brake switch is set to ON or OFF. But when the swing brake switch is set to OFF, and the PTO switch is set to the operation position ("WORK 1" or "WORK 2"), the swing brake is not applied. Therefore, when the PTO switch is set to the travel position, set the swing brake switch to ON.

14. SWING FREE SWITCH



This switch is used to free or lock the swing system.
FREE: This is used for the continuous swing operation.
LOCK: This is used for the regular swing operation.

When switching between the swing free and lock, stop swinging the machine.

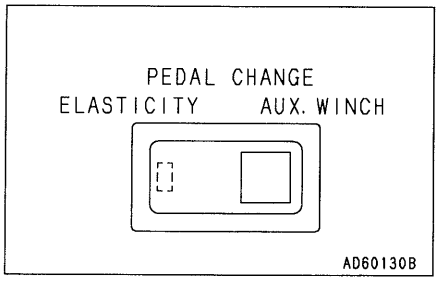
At the swing free status, take care for the slope, wind, the drift due to the swing inertia.

When the PTO switch is set to "WORK 1" or "WORK 2", and the swing free is set, the operation display lamp (orange) in the switch lights.

But, when working at night, "SWING FREE" character portion of the switch lights regardless of the switch operation position.

Make sure the operation positions of the swing free or the lock by the decal of the switch upper portion.

15. PEDAL SWITCH



⚠ WARNING

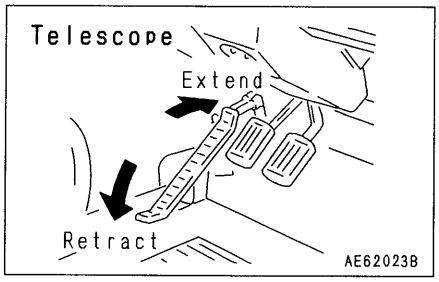
- **Do not operate the pedal and the lever to the opposite directions simultaneously.**
  It is very dangerous not knowing what directions the work equipment will move.
- **When operating the simultaneous operations of the different directions from the pedal switch, the following errors are displayed.**
  1) When operating by the telescope, "OSS error EB1" is displayed.
  2) When operating by the auxiliary winch, "OSS error EB5" is displayed.

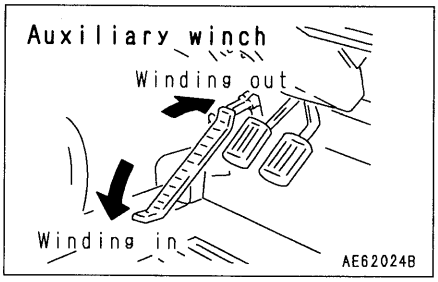
This switch is used to switch the function of the boom telescope/ auxiliary winch switching pedal.
Telescope: The pedal acts as the boom telescope operation pedal.
Auxiliary winch: The pedal act as the auxiliary winch operation pedal.

When the PTO switch is set to "WORK 1" or "WORK 2" and when this switch is changed to the boom telescope, the operation display lamp in the switch lights.

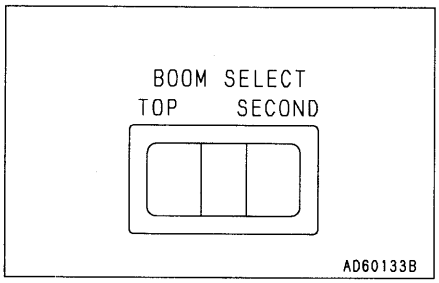
During the pedal operation, do not change the switch.

In addition, when working at night, "PEDAL CHANGE" character portion of the switch lights regardless of the switch operation position.





16. BOOM SELECTOR SWITCH



⚠ WARNING

- **When operating the crane, do not depress the boom selector switch. This may damage the machine.**
- **After operating the telescoping operation by depressing the boom selector switch, retract the boom to the min. length. When operating the crane, after ensuring the min. length status, set surely the boom to the specified length by the boom automatic telescoping.**
  Unless the boom length is set by the boom automatic telescoping from the min. length status, the correct weight table cannot be obtained. Unless the weight table is correct, the machine may fall down or be damaged.

This switch is used to telescope the boom stages required for the maintenance and inspection except the automatic telescoping order.
TOP: Telescoping 3rd, 4th, 5th stage.
BOOM: After 2nd boom extending (retracting), extending (retracting) 3rd, 4th, 5th boom.
SECOND: Telescoping only 2nd boom.

Only during depressing the switch, the function is switched.

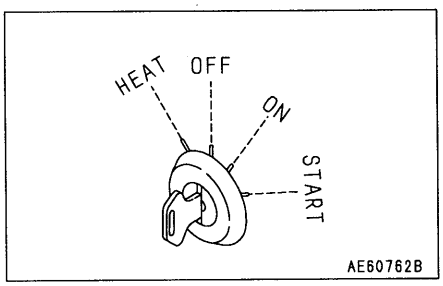
When operating the crane, set to the boom.

When operating the crane, do not depress the "TOP" "SECOND" switches.

In addition, when working at night, "BOOM" character portion of the switch lights regardless of the switch operation position.

17. STARTING SWITCH

This switch is used to start and stop the engine.



OFF

The key can be inserted and removed at this position. When the key is turned to this position, the electric circuit is turned off and the engine stops.

ON

Electricity flows to the charging circuit and accessory circuit. Return the key to this position after starting the engine.

START

This is the position for starting the engine. When the engine starts, release the key. The key will return automatically to the ON position.

The engine does not start in the following cases.

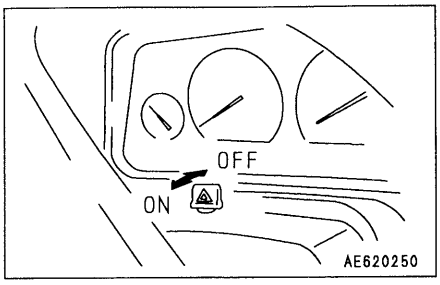
- When the gear shift lever is put in except "N" (neutral).
- When the emergency gear shift switch is put in "ON", and the emergency gear shift control switch is put in except "N" (neutral).

HEAT

When the ambient temperature is low, turn the key to this position to warm up the engine intake air and make it easier for the engine to start. When the key is released, it will return to the STOP position, so turn it immediately to the START position to start the engine.

18. HAZARD SWITCH

This is used in emergencies, such as when the machine has broken down.

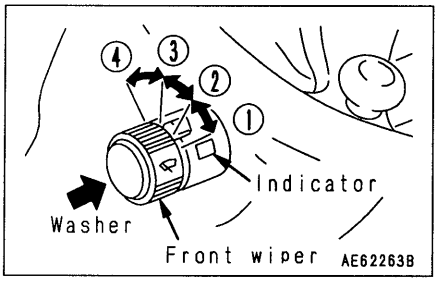


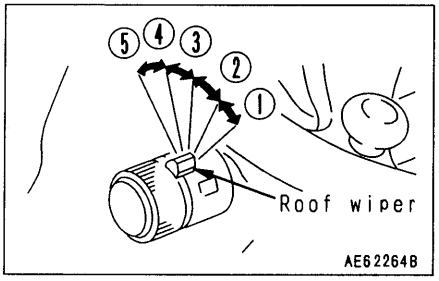
ON position: Flashes

The left and right turn signal lamps at the front and rear of the machine flash. When the PTO switch is at the TRAVEL position, the swing flasher also flashes.
When this switch is turned ON, the hazard indicator lamp flashes.

19. WIPER, WASHER SWITCH

This switch actuates the wipers for the front glass and roof glass. Wiping off the dry grass causes damage to grass. Spray the washer fluid and then operate the wiper.





Front wiper switch		Roof wiper switch	
① OFF :	The wipers stop.	① ⊓ :	The washer fluid is sprayed out.
② INT :	The wipers move at 4- to 7-second intervals.	② OFF:	The wipers stop.
③ LOW:	The wipers move at low speed.	③ INT:	The wipers move at 4- to 7-second intervals.
④ Hi:	The wipers move at high speed.	④ ⊓ :	The wipers are actuated.
		⑤ ⊓ :	The wipers are actuated with spraying the washer fluid.
If the button at the tip of the switch is pressed, washer fluid is sprayed out.Do not keep the washer spray button pressed for more than 10 seconds continuously.			

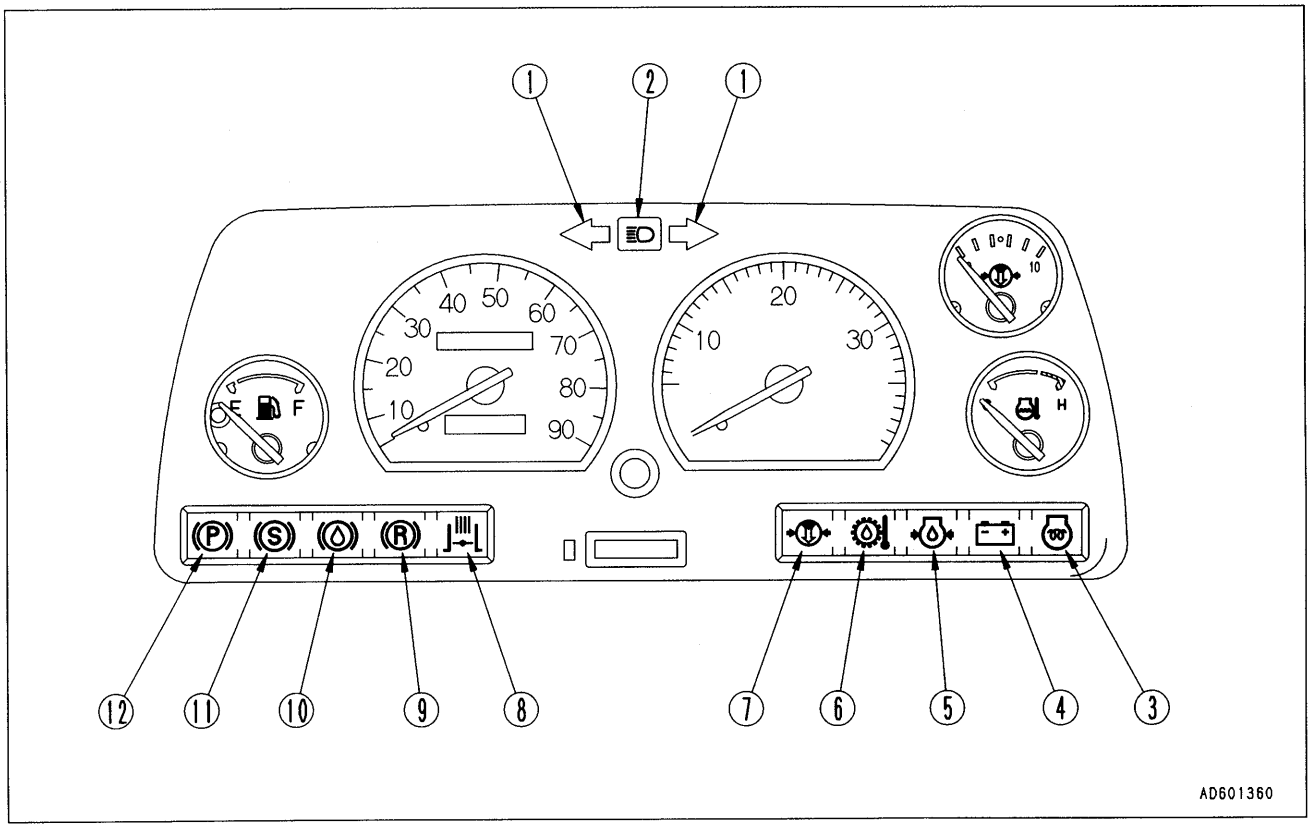
20. RADIO

For details, see "11.16 CAR RADIO".

21. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

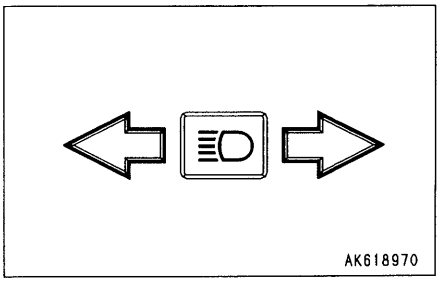
For details, see "12.35 SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)".

11.2.3 LAMPS



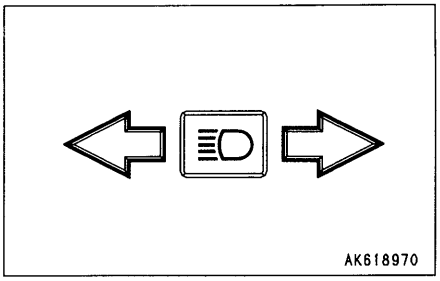
1. TURN SIGNAL INDICATOR PILOT LAMPS

These lamps flash (green) together with the turn signal indicator lamps.



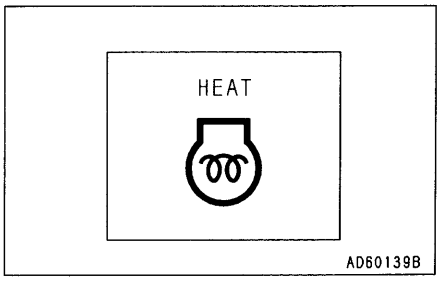
2. HIGH BEAM PILOT LAMP

This lamp lights up (blue) when the head lamps are turned to high beam.



3. GLOW LAMP (RED)

This lights up when the electrical air intake heater is being actuated.

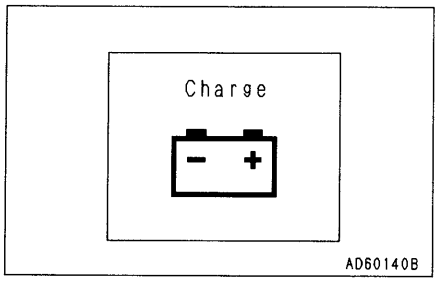


4. BATTERY CHARGE CAUTION LAMP (RED)

This lamp lights up to warn that the charging is not being carried out properly when the engine is running.

When it lights up, the buzzer sounds.

If it lights up, stop the engine and check the V-belt for looseness. If any abnormality is found, see "15.3 OTHER TROUBLE".



REMARK

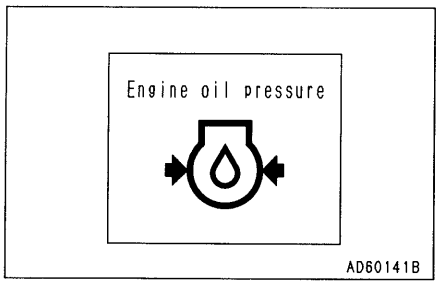
When the engine is stopped, if the starting switch is at the ON position, this lamp will light up, but it does not indicate any abnormality.

5. ENGINE OIL PRESSURE CAUTION LAMP (RED)

This lamp lights up if the engine lubricating oil pressure goes below the normal value.

When it lights up, the buzzer sounds.

If it lights up, stop the engine, and check for any abnormality. If any abnormality is found, see "15.3 OTHER TROUBLE".



REMARK

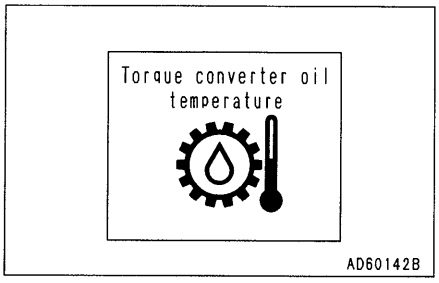
When the engine is stopped, if the starting switch is at the ON position, this lamp will light up, but it does not indicate any abnormality.

6. TORQUE CONVERTER OVERHEAT CAUTION LAMP (RED)

This lamp warns the operator if the torque converter oil temperature rises.

When the lamp lights up, the buzzer sounds.

If it lights up during operation, stop the machine, run the engine at low idling, and wait for the temperature to go down.

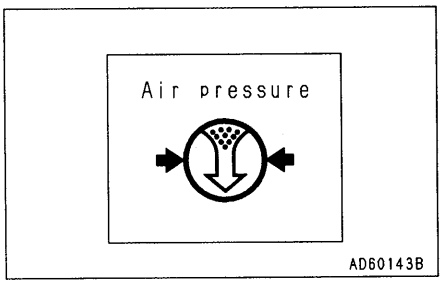


REMARK

To check that the bulb is not blown, this lamp lights up when the starting switch key is turned to the ON position. Check that it lights up for 2 seconds, and then goes out.

7. AIR PRESSURE CAUTION LAMP (RED)

This warns the operator that the air pressure in the air tank has dropped.
When it lights up, the buzzer sounds.
If it lights up, stop the machine, increase the engine speed, and wait for the lamp to go out.

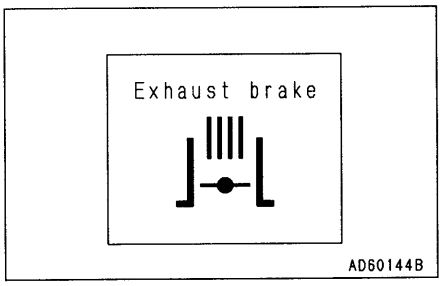


REMARK

If the brake is depressed suddenly, the air pressure lamp may light up momentarily, but this does not indicate an abnormality.

8. EXHAUST BRAKE INDICATOR LAMP (ORANGE)

This informs the operator that the exhaust brake switch is ON. This lamp lights up when the exhaust brake switch is ON and accelerator pedal is OFF (low idling).



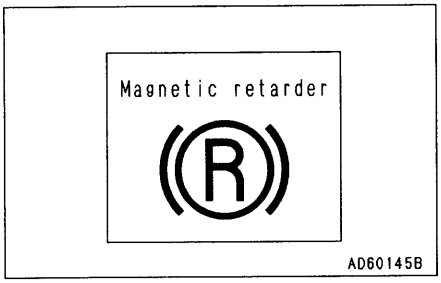
9. MAGNETIC RETARDER INDICATOR LAMP (ORANGE) (OPTION)

This informs the operator that the magnetic retarder (option) switch is ON.

The indicator lamp flashes as follows.

- 1 time/sec: The temperature of the retarder drum rises.
- 2.5 times/sec: The temperature of the retarder coil rises.

In both cases, the brake power of the retarder is down to prevent overheating. Travel carefully.



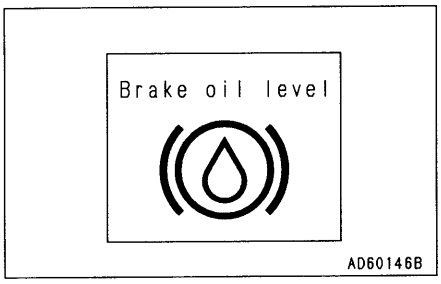
10. BRAKE OIL LEVEL CAUTION LAMP (RED)

This warns the operator that the level of the brake fluid in the tank has dropped.

When it lights up, the buzzer sounds.

If it lights up, stop the machine, and check for leakage of the brake fluid. If any leakage is found, repair the problem, then add brake fluid.

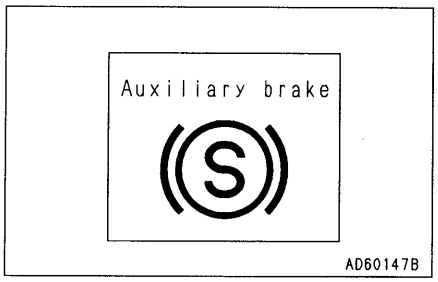
If the machine is driven continuously downhill, the brake fluid may overheat. In this condition, the lamp may also light up. If this happens, wait for at least 30 minutes, then depress the brake pedal and check that the lamp does not light up. If there is no abnormality, the machine may be driven again.



REMARK

When the starting switch key is turned to the ON position, this lamp will light up for 2 seconds and then go out.

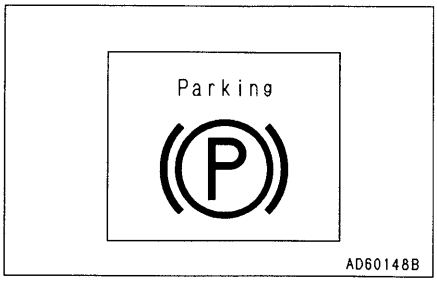
11. AUXILIARY BRAKE INDICATOR LAMP (RED)
This lights up when the auxiliary brake is actuated.



Auxiliary brake ON: Lights up

Before moving the machine, check that the lamp is out.

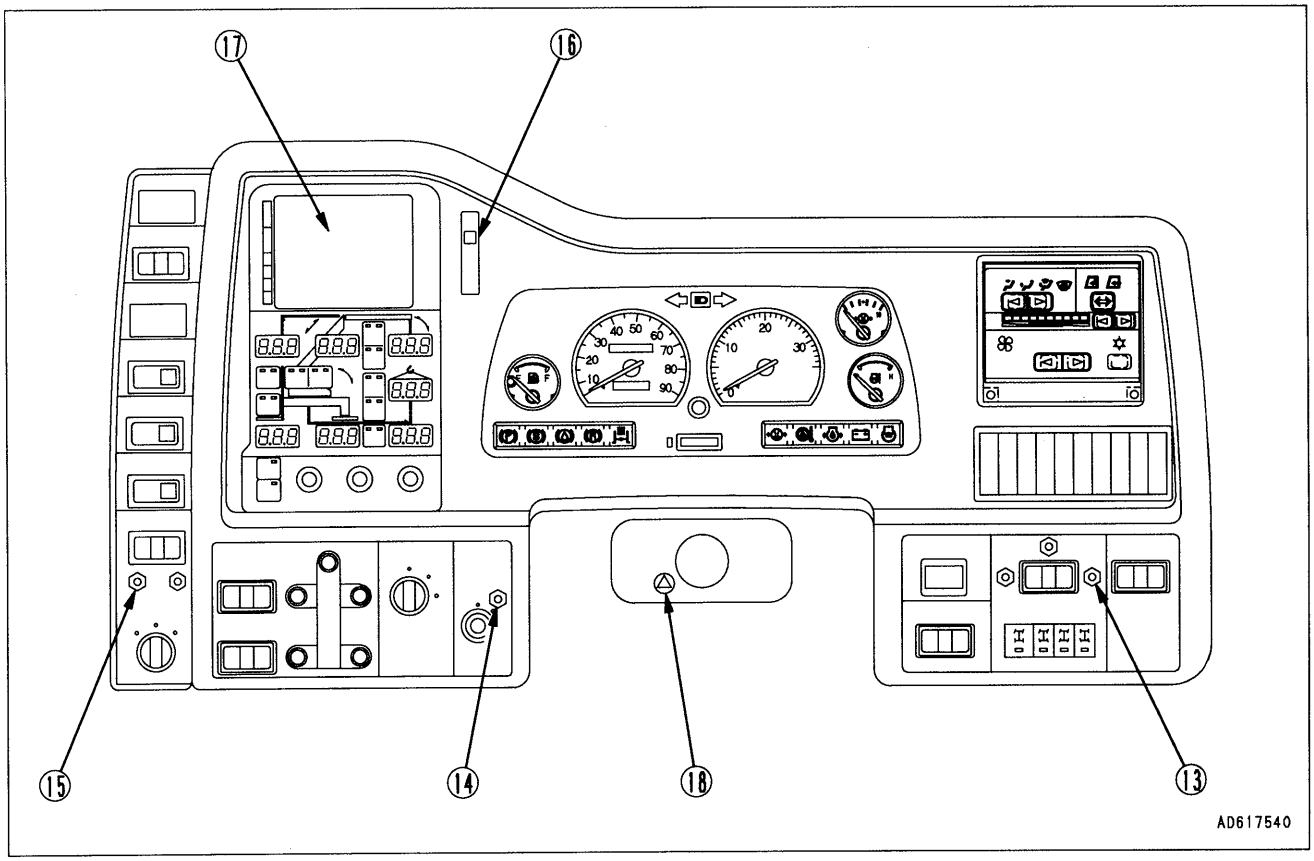
12. PARKING BRAKE INDICATOR LAMP (RED)
This lights up when the parking brake is actuated.



Parking brake switch at AUXILIARY or PARKING: Lights up

Before moving the machine, check that the lamp is out.

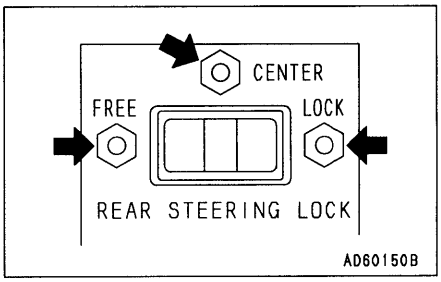
REMARK
When the air pressure lamp lights up, the parking brake lamp lights up without regard to releasing the parking brake or not. This is not abnormal. While the parking brake is applied, if the gear shift lever is moved to any position other than N, the buzzer will sound.



13. REAR STEERING LOCK INDICATOR LAMP

This shows if the rear wheels are at the center and shows what position the lock pin is in. The lamps go out, flash, or light up; the combination of the lamps indicates the condition.

When the rear steering lock is not applied, center ○, lock ●, free ● lamp display lights up, but do not travel in this condition. Insert the lock pin and light up the lock lamp (lock ○) before traveling. For details of using the lock, see "12.12 SPECIAL TRAVEL".



REMARK

Center indicator lamp: Lights up when the rear wheel is in straight drive.

Free, Lock indicator lamp: Each indicator lamp lights up when the lock pin is canceled or locked respectively.

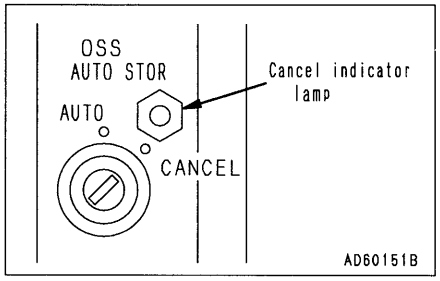
• Key to symbols ○: ON, ●: OFF, ◐: Flashes

	Center	Lock	Free	Number of flash	Causes (main example)
Failure	◐	◐	◐	All flash	Failure of the directive system
	●	●	●	All OFF	Failure of the detective switch (when not in center)
	○	●	●	one ON	Failure of the detective switch (when in center)
	●	◐	◐	two flash	Lock/free detection at the same time (when not in center)
	○	◐	◐	two flash	Lock/free detection at the same time (when in center)
	◐	◐	●	two flash	Traveling with rear steering lock when other than "front 2-wheel"
	●	◐	●	one flashes	Lock was detected although it was not in center
Operation error	●	●	◐	one flashes	• Traveling without lock when "front wheel" mode (when not in center)
	○	●	◐	one flashes one ON	• Traveling without lock when "front wheel" mode (when in center)
	○	◐	●	one flashes one ON	• Set "4-wheel", "crab" or "rear wheel" mode in spite of the lock state.
Normal	○	○	●	–	• "Front wheel" mode and rear steering
	○	●	○	–	• Rear center is out when "4-wheel", "crab" or "rear wheel" mode
	●	●	○	–	• Rear center is not out when "4-wheel", "crab" or "rear wheel" mode

If any of the failure displays appears, try canceling the rear steering lock.

14. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) CANCEL INDICATOR (RED)

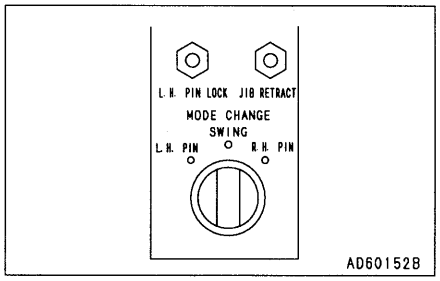
This lights up when the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) cancel switch is turned to the CANCEL position.



15. LEFT PIN LOCK COMPLETION INDICATOR LAMP (GREEN) JIB STOW COMPLETION INDICATOR LAMP (GREEN)

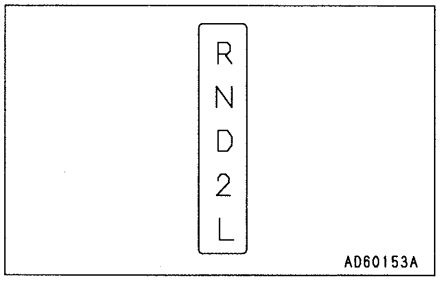
L.H PIN LOCK: When completion of the jib extending, stowing or insertion of the jib connection pin at the side of the boom, this lamp lights up.

JIB RETRACT: When the jib is positioned at the left side of the boom during extending or stowing the jib, this lamp lights up.

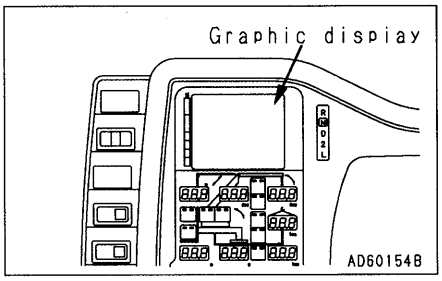


16. GEAR SHIFT LEVER POSITION INDICATOR

This shows the position of the gear shift lever.



17. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) GRAPHIC DISPLAY CONCENTRATED DISPLAY



(Display example)

- "Hyd. temp. 70°C"
  This is displayed when hydraulic oil temp rises higher than 70°C.
  In this case, stop operation, and wait until the temperature lowers.
- "Accumulator Lower"

⚠ WARNING

- **If this lamp lights up, lock the drums of both the main winch and auxiliary winch and contact your Komatsu distributor.**
- **If this lamp lights up, place the winch levers of both the main winch and auxiliary winch at the N position. Do not operate the winches under any circumstances.**

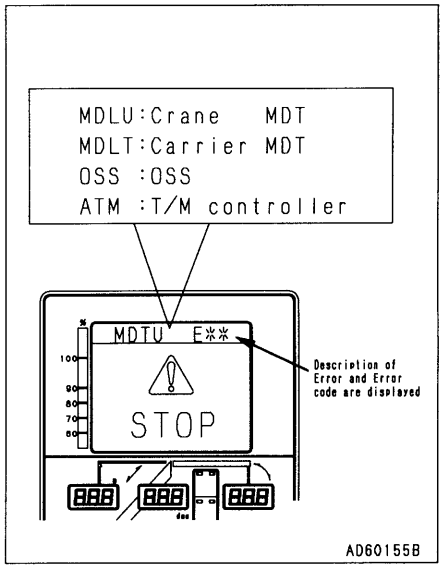
This lamp indicates that the pressure in the winch clutch cylinder has dropped.

When it lights up, the alarm buzzer sounds (continuously), so stop operations immediately.

- "Overrun"
  When the speed is over the allowed speed, this is displayed. The alarm buzzer also sounds (continuously). Release the accelerator pedal or depress the brake pedal to slow down the speed.

- "Neutral safety"
  If the gear shift lever is at other than "N" position when starting the engine, this is displayed and the alarm buzzer sounds (continuously for two seconds). Return the gear shift lever to "N".

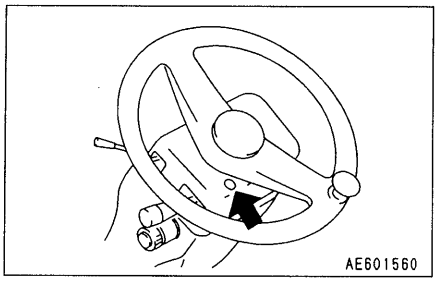
- "EMERGENCY STOP ERROR DISPLAY"
  When the machine control is disabled (or matters like that) such as T/M controller abnormal during traveling, OSS controller abnormal when working or MDT upper and lower correspondence abnormal, the graphic display is showed as the right, and the buzzer (continuously for two seconds) sounds. Immediately stop the operation and inspect the failure.



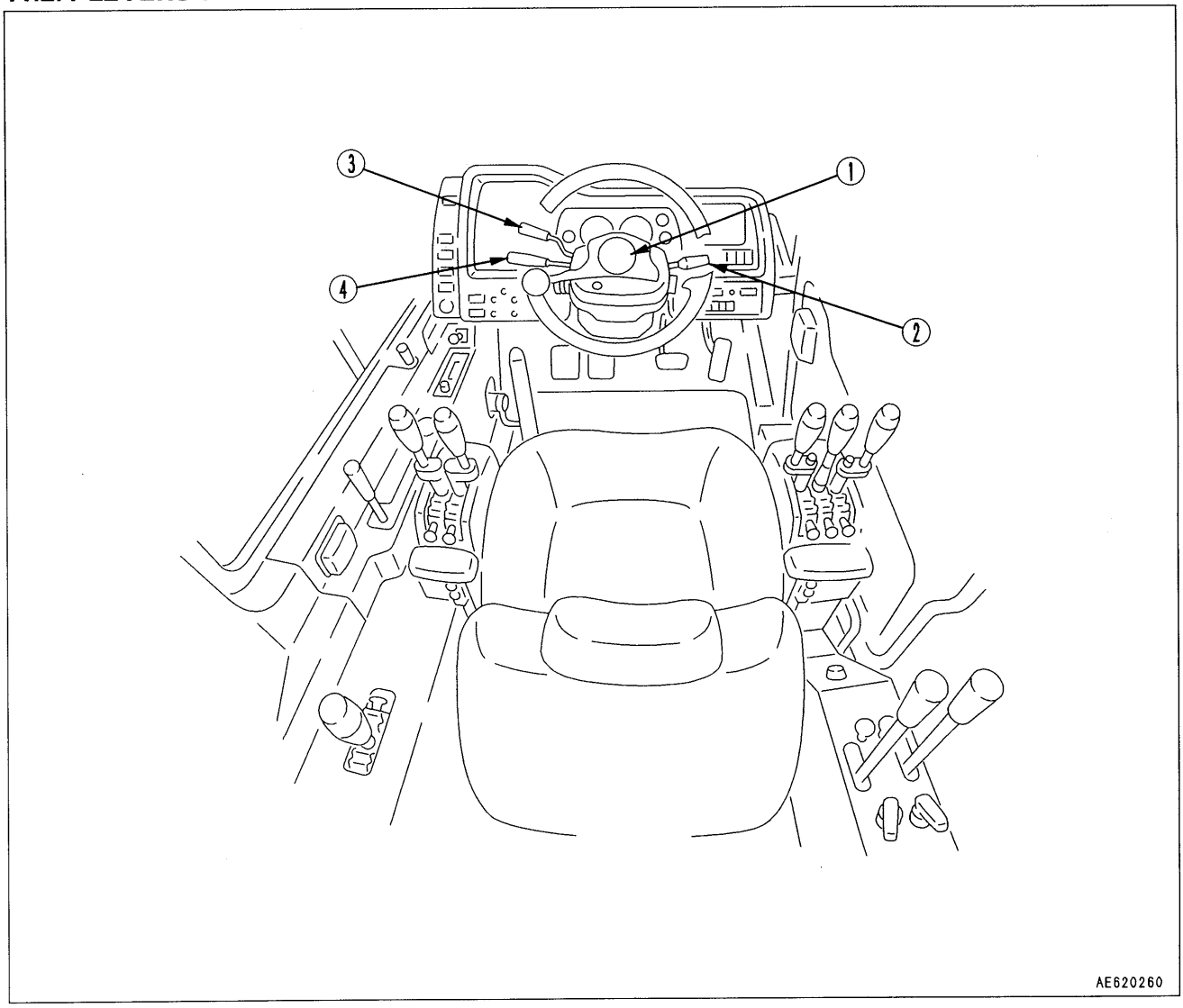
For other displays, see "MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)" items.

18. HAZARD SWITCH INDICATOR (RED)

This flashes when the hazard switch is ON.

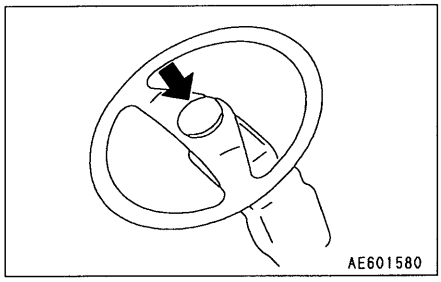


11.2.4 LEVERS AND SWITCHES



1. HORN BUTTON

Press the button in the center of the steering wheel to sound the horn.

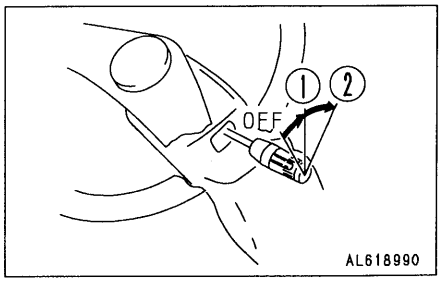


2. LAMP SWITCH

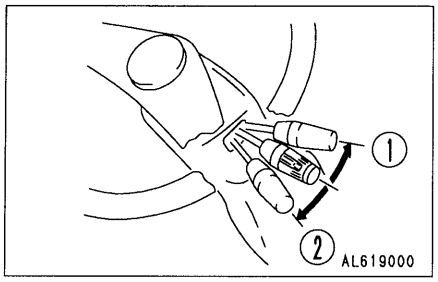
This switch is turned to light up the head lamps, tail lamps, license number lamp, boom lamp, side clearance lamps, and gauge lighting.

① Stage 1: Tail lamps, number lamp, boom lamp, side clearance lamp, and gauge lighting light up

② Stage 2: Head lamps light up in addition to lamps at stage ①.



2. TURN SIGNAL INDICATOR LEVER



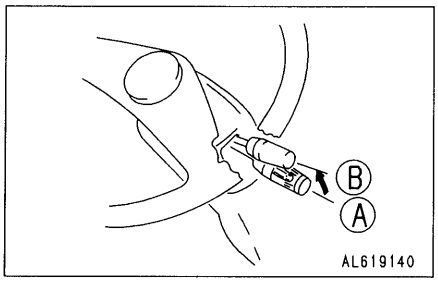
This operates the turn signal indicator lamps.

① Left turn: Push the lever forward

② Right turn: Pull the lever back

When the lever is operated, the turn signal pilot lamp also flashes at the same time. When the PTO switch is at the TRAVEL position, the swing flasher also flashes.

2. DIMMER SWITCH



This switches the head lights between the high beam and low beam positions.

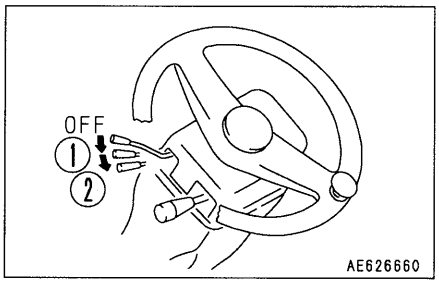
Operate the lever in direction Ⓑ until a click is heard. Each time there is a click, the head lamps are switched from low beam to high beam or from high beam to low beam.

If the lever is operated to the position before the click is heard, the head lamps will flash to inform the vehicle in front that you are going to pass.

The head lamps can be flashed even when the lamp switch is at the OFF position.

When the lever is released, it will return automatically to the Ⓐ position.

3. EXHAUST BRAKE SWITCH, MAGNETIC RETARDER SWITCH (OPTION)

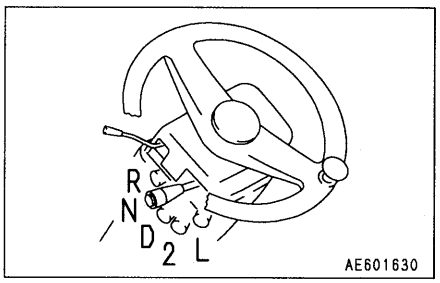


This switch is used to reduce the load on the foot brake when traveling downhill or when traveling in urban areas where the foot brake must be operated frequently.

① Exhaust brake: If the accelerator pedal is released, the exhaust brake is applied.

② Exhaust brake + magnetic retarder (option): For machines equipped with the magnetic retarder, if the accelerator pedal is released, the exhaust brake and magnetic retarder are applied.

4. GEAR SHIFT LEVER



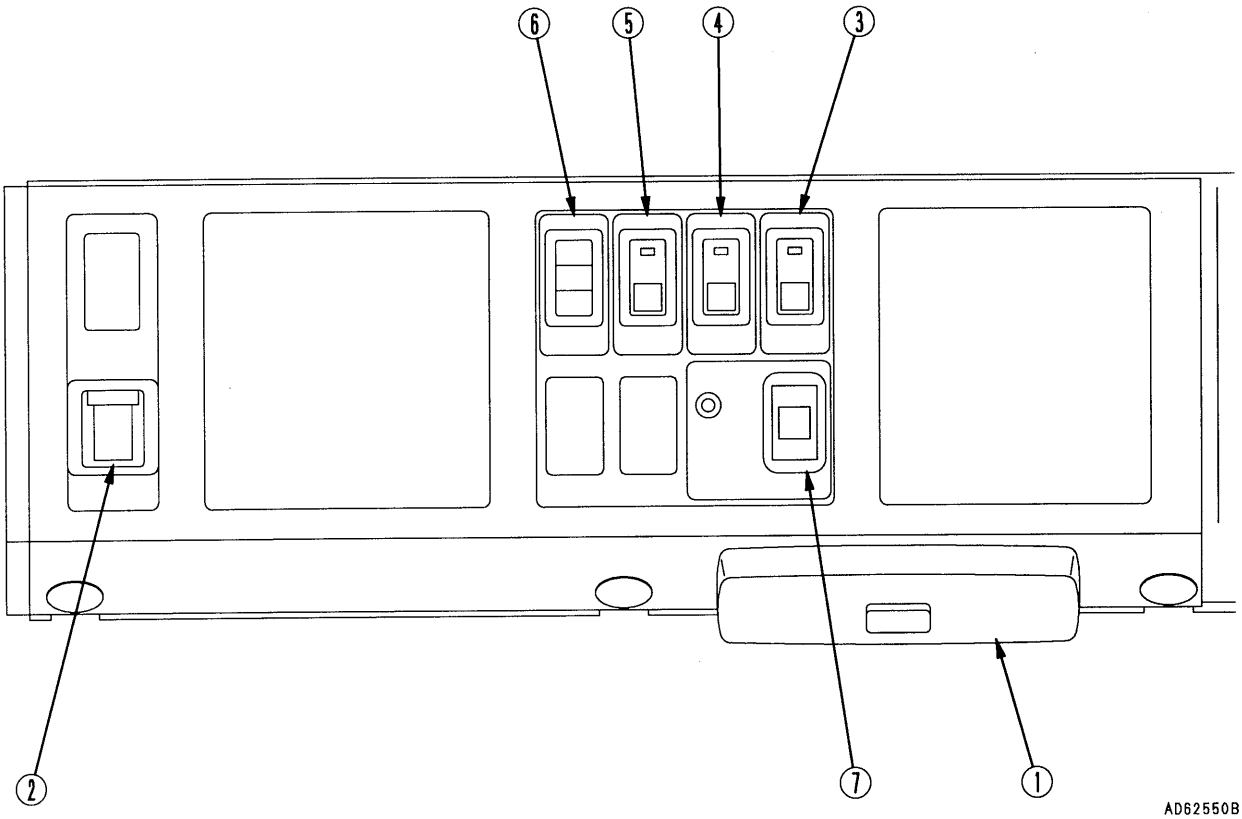
This lever is used to select the direction of travel and the speed range of the transmission.

If this lever is not at the N position when starting the engine, the engine will not start. Three forward ranges (D,2,L) and 1 reverse position (R) can be selected.

The transmission is shifted automatically only when the lever is at the D position.

When shifting 2 → L, N → R, lift up the lever to move it.

11.3 TOP PANEL GROUP



1. ROOM LAMP

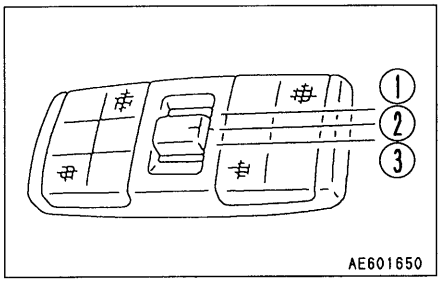
The room lamp can be lit up.

①: OFF

②: When the door is opened it lights up, and when the door is closed, it goes out.

③: ON

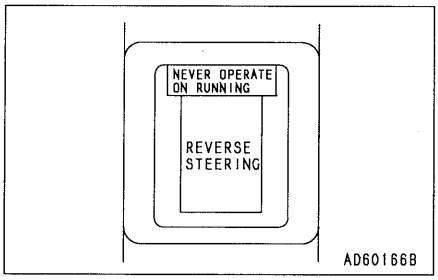
Be careful not to leave the lamp ON.



2. REVERSE STEERING COMPENSATION SWITCH

⚠ WARNING

- **Do not travel on public roads while using reverse steering which the upper structure is turned to face the rear.**
- **When traveling by using reverse steering, never touch the reverse steering switch. If steering is switched during traveling, it is extremely dangerous because the direction of operating the steering wheel becomes the reverse of the direction of movement of the machine.**



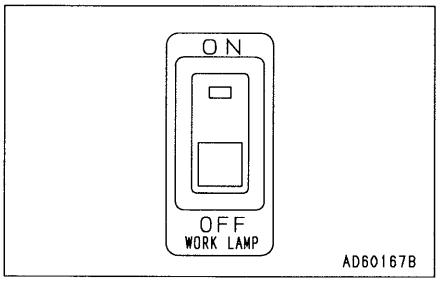
When the upper structure is turned to face the rear, use the compensation to prevent the steering from being reversed.

When the cover is opened and the switch is pressed, the reverse steering compensation mechanism is actuated. When the switch is pressed again, it returns to the original setting.

The range which the reverse steering can be used is that the upper structure is within approx. 10° toward the rear of the machine.

When the switch is ON, the pilot lamp (red) inside the switch lights up, when the night lighting is switched on, "REVERSE STEERING" character portion inside the switch lights up green when it is OFF.

3. WORKING LAMP SWITCH



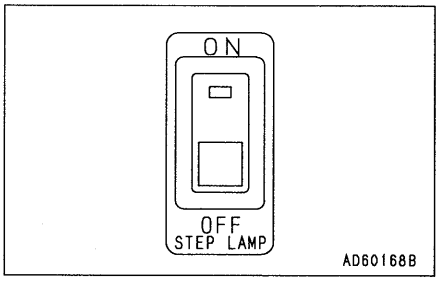
This switch is used to operate the working lamp.

When this switch is turned "ON", the working lamp lights up.

The working indicator lamp (orange) is also lights up. This switch should not be lit on the public road.

When working at night, "WORK LAMP" portion inside the switch lights up regardless of the switch position.

4. STEP LAMP SWITCH

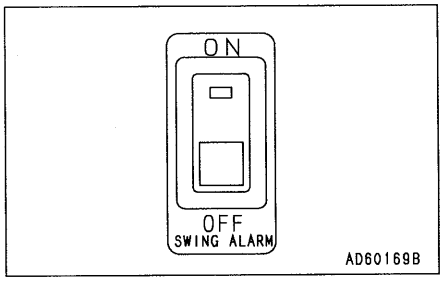


The switch is used to switch the light when riding on or off the cab at night.

OFF: The light goes off whether the door is opened or not.
ON: The light turns on when the door is opened, and the light turns off when the door is closed.

During the switch is ON, when the door is opened, the working indicator lamp (orange) inside the switch light up.
In addition, when working at night, "STEP LAMP" character portion inside the switch lights up regardless of the operation position of the switch.

5. SWING ALARM BUZZER SWITCH



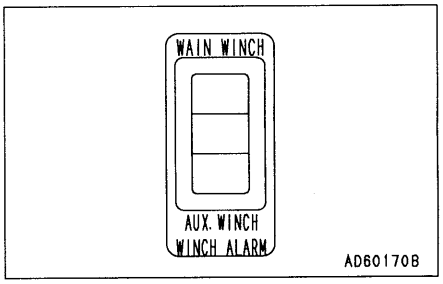
This switch is used for the swing alarm buzzer.

When setting to "ON" position, during swinging, the swing alarm buzzer sounds and the swing flasher lamp flashes. And when this switch is ON, during swinging, the operation indicator lamp (orange) inside the switch flashes.

REMARK

- When the PTO switch is set to "Work 1" or "Work 2", this switch can be operated.
- When working at night, "SWING ALARM" character portion inside the switch lights up regardless of the operation position of the switch.

6. WINCH BUZZER SWITCH



This is the switch for the winch buzzer which informs the starting of the winch winding-up and the winch winding-down by the intermittent buzzer sound.

MAIN WINCH: The buzzer sounds when the main winch is operated (winding-up and winding-down), and "MAIN" character lights up.

NEUTRAL: The buzzer is OFF.

AUX. WINCH: The buzzer sounds when the auxiliary winch is operated (winding-up and winding-down), and "AUX" character lights up.

The buzzer sounds only when the winch speed is slow, but the speed becomes faster, the buzzer does not sounds.
When the winch lever is not operated, but the winch drum rotates, the buzzer may sounds. In this case, this is not abnormal.

REMARK

- When the PTO switch is set to "Work 1" or "Work 2", this switch can be operated.
- When working at night, "WINCH ALARM" character portion inside the switch lights up regardless of the operation position of the switch.

7. SUSPENSION SWITCH

⚠ WARNING

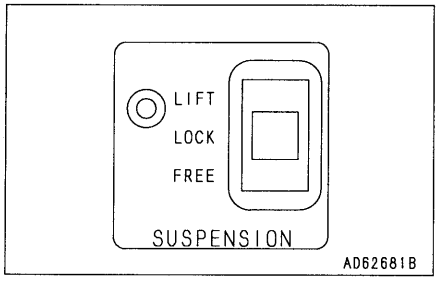
- **Lock the suspension, then confirm that the axle stopper is in contact with the frame (Four places at the front, rear, right, and left). The suspension is locked under this condition.**
- **On-tire work is permitted only under this condition.**
- **If the machine is operated or travels without locking the suspension, the load will swing largely and the machine may fall over.**

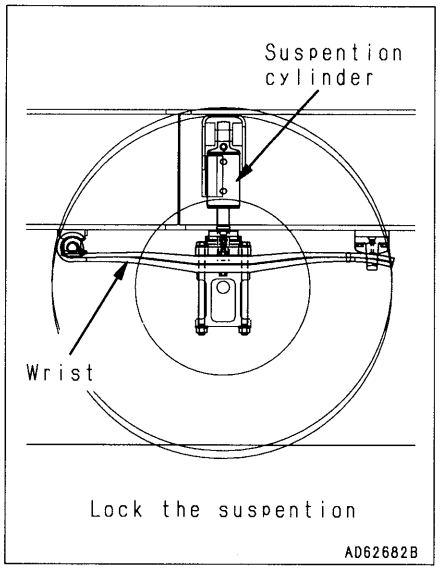
This switch is used to lock and release the suspension cylinder.

LIFT: If the switch is set to the LIFT position, the suspension cylinder is retracted.

LOCK: If the "LIFT" position of the suspension switch is pressed and held to retract the suspension cylinder until the axle stopper touches the underside of the frame and the switch is released, the switch is automatically set to the "LOCK" position. At this position, the suspension is locked. The indicator lamp (Green) of the suspension switch lights up when it is at the "LIFT" and "LOCK" position.

FREE: If the switch is set to the "FREE" position, the suspension cylinder is extracted and set free.

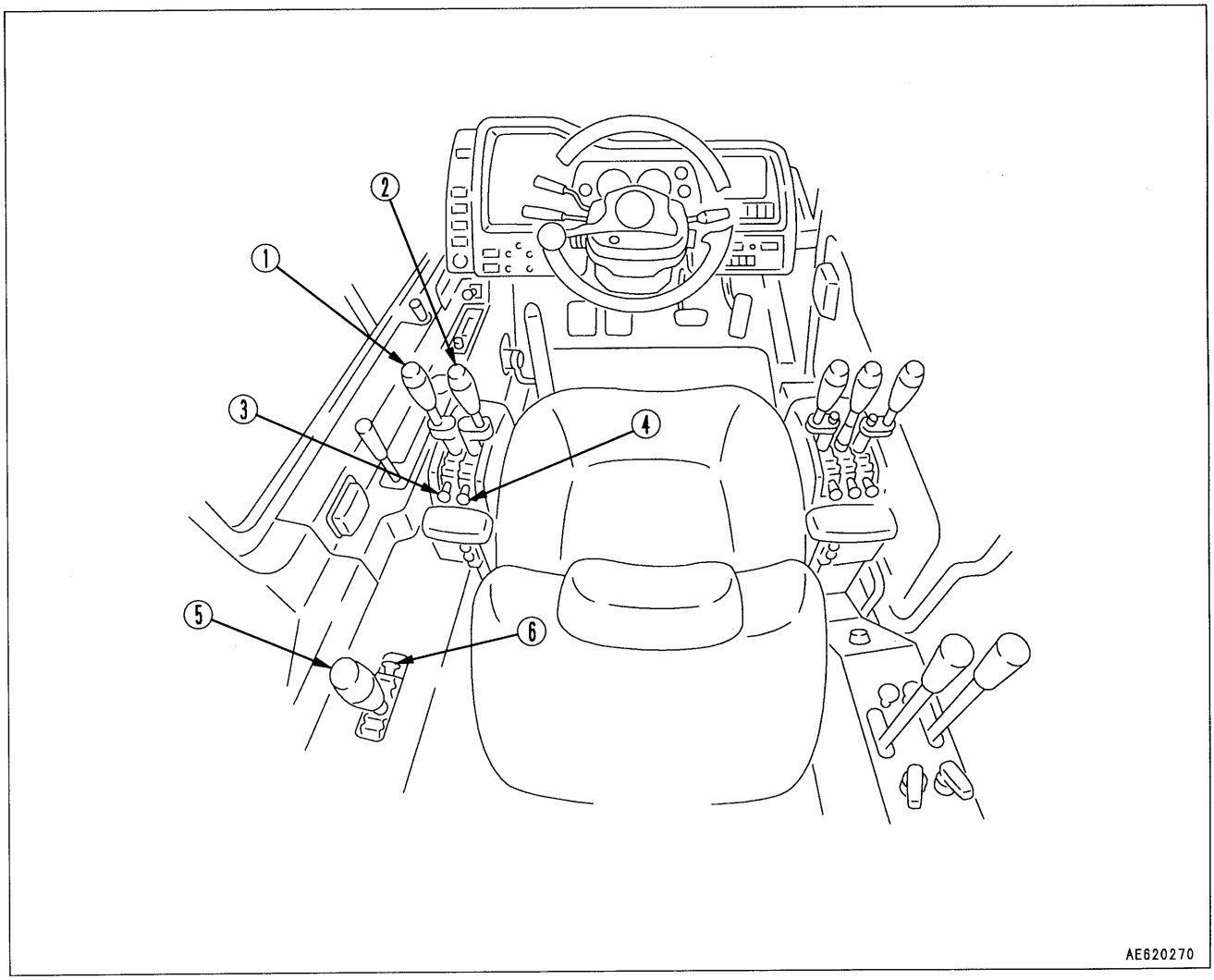




REMARK

- Before operating the suspension switch, turn the PTO switch to the "WORK 1" position.
- If the lamp for night work is turned on, the letters of "SUSPENSION" in the switch lights up, regardless of the position of the switch.

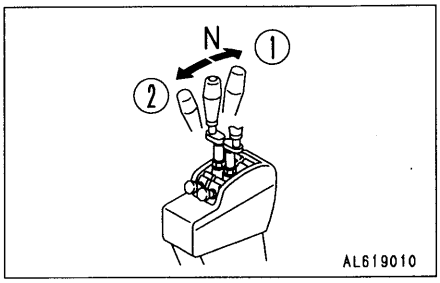
11.4 SIDE PANEL GROUP
11.4.1 LEFT SIDE PANEL



1. SWING CONTROL LEVER (WITH HORN SWITCH)

This is used to swing the upper structure.

Position ①: Left swing
Position ②: Right swing
N position: The upper structure is stopped and kept at the same position.



When the lever is operated, the swing flasher flashes and the horn sounds.

REMARK

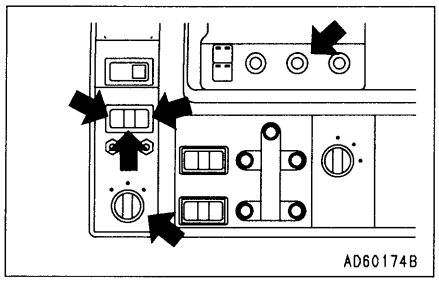
The swing buzzer do not sound when the "SWING ALARM BUZZER" switch is set to "OFF".

HORN SWITCH

Press the button at the tip of the lever to sound the horn.

2. POWER TILT JIB CONTROL LEVER

This lever is used to tilt the jib and extend/stow the jib.

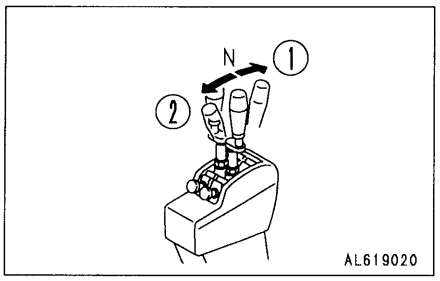


⚠ WARNING

- **When operating the tilt extend/stow, always set the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) working mode switch to "PREPARATION".**

WHEN THE JIB SWITCH IS JIB POSITION

Position ①: Tilt LOWER
Position ②: Tilt RAISE
N position: The jib is stopped and held at the same position.



WHEN JIB SWITCH IS PLACED AT JIB EXTEND AND STOW

Position ①: The jib is stopped and held at the same position.
Position ②: Dedending on the position of the mode switch, the cylinders for jib extending, job stowing are operated.
Position N: The jib is stopped and held at the same position.

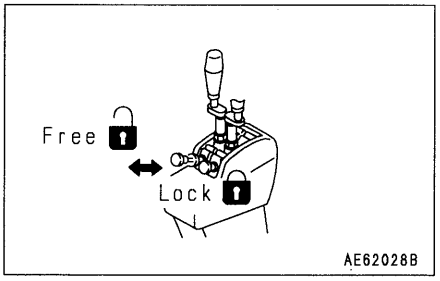
REMARK

- When extending or stowing the jib, use the power tilt jib control lever.
- In this case, set the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) crane operating mode switch to "Procedure" and set the jib switch to "EXPAND" or "RETRACT".
- Then, when set the mode selector switch to "LEFT PIN", ROTATION" or "RIGHT PIN" and set the power tilt jib control lever to ②, "LEFT PIN CYLINDER", ROTATION CYLINDER" or "RIGHT PIN CYLINDER" are actuated respectively.

3. SWING CONTROL LEVER LOCK KNOB

⚠ WARNING

When not carrying out operations, always place the swing control lever at the neutral position and apply the lock.

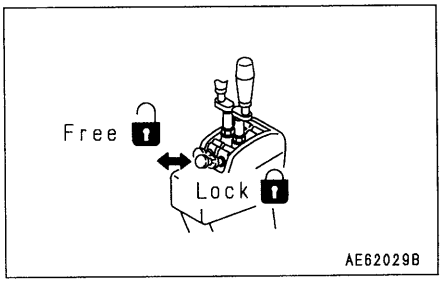


This knob is used to lock the swing lever.

When setting to the FREE position, pull up until the lock knob stops.

When applying the lock, push the lock knob down and check that the swing control lever is locked.

4. POWER TILT JIB CONTROL LEVER LOCK KNOB



⚠ WARNING

When not using the power tilt jib, always place the lever at the neutral position and apply the lock.

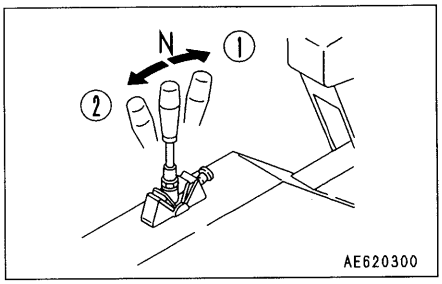
This knob is used to lock the power tilt jib control lever.

REMARK

When setting to the FREE position, pull up until the lock knob stops.

When applying the lock, push the lock knob down and check that the winch control lever is locked.

5. BOOM TELESCOPE CONTROL LEVER



This is used to extend and retract the boom.

Position ①: Extend

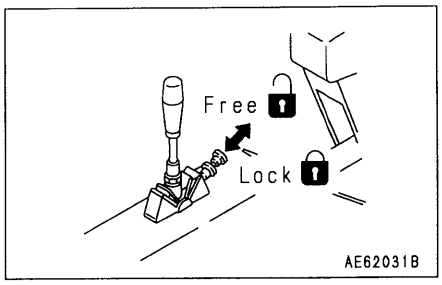
Position ②: Retract

N position: The boom is stopped and held at the same position.

NOTICE

There is an overwind safety system, so lower the hook before extending the boom.

6. BOOM TELESCOPE CONTROL LEVER LOCK KNOB



⚠ WARNING

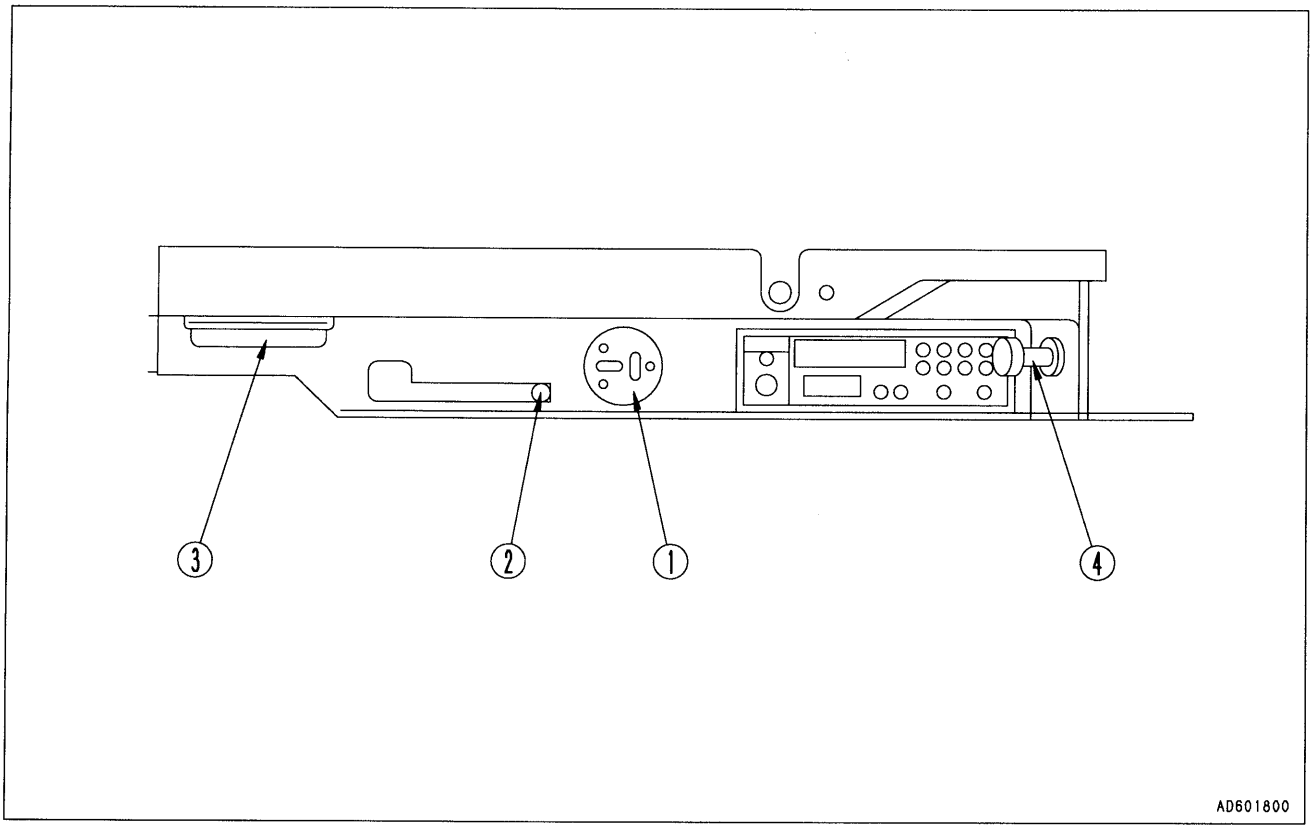
When not working, always place the lever at the neutral position and apply the lock.

This knob is used to lock the boom telescope control lever.

When setting to the FREE position, pull up until the lock knob stops.

When applying the lock, push the lock knob down and check that the boom telescope control lever is locked.

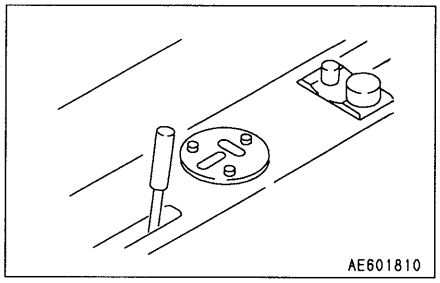
11.4.2 LEFT SIDE PANEL



1. SPIRIT LEVEL

This is used to check that the chassis is horizontal.

Always set the chassis in a horizontal position when carrying out operations.



2. SWING LOCK LEVER

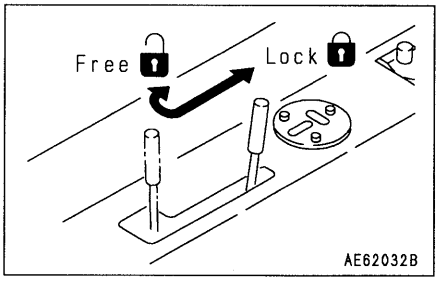
⚠ WARNING

Never operate the swing when the swing lock lever is at the LOCK position.

This lever is used to lock the upper structure.

Pull the lever up to release the lock.

Apply the lock for general travel operations and when traveling with a raised load.

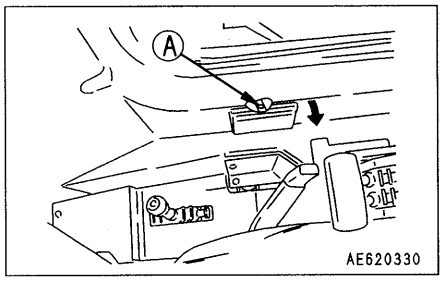


NOTICE

When applying the lock, always make sure that the upper structure is parallel to the chassis.

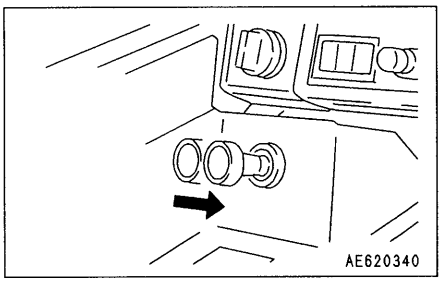
3. ASHTRAY

Pull the ashtray to open.
Press Ⓐ to remove the ashtray.

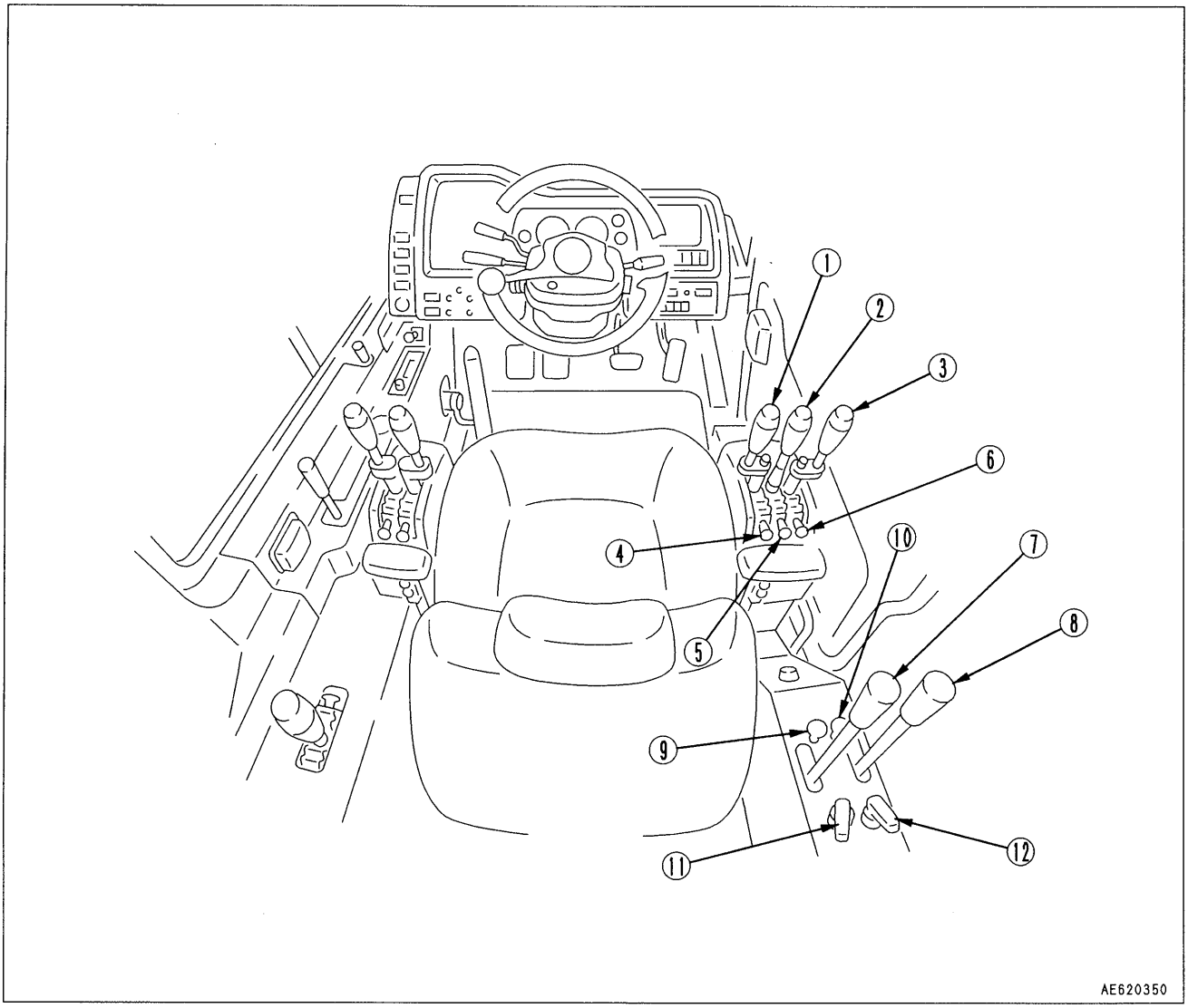


4. CIGARETTE LIGHTER

This is used to light cigarettes. If the cigarette lighter is pushed in, it will return to its original position after a few seconds, so pull it out and use it to light your cigarette.



11.4.3 RIGHT SIDE PANEL

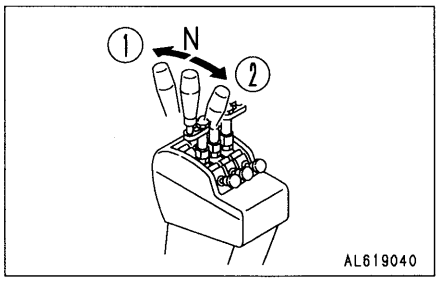


1. AUXILIARY WINCH CONTROL LEVER

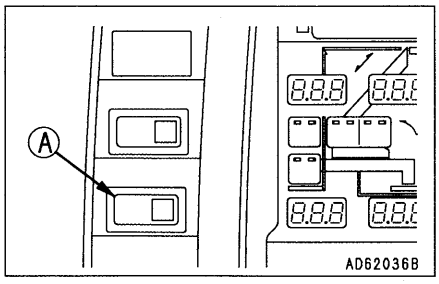
⚠ WARNING

When winding in a load, operate swing free switch Ⓐ when the load comes off the ground, and release the switch after the load is clear of the ground.

This is used to operate the auxiliary winch.



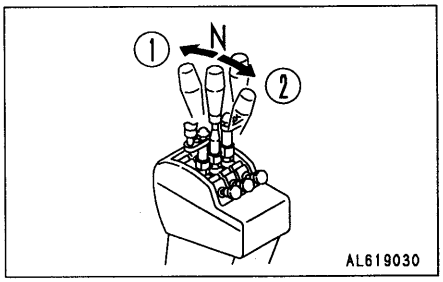
Position ①: Wind out
Position ②: Wind in
N position: Neutral
Swing free switch Ⓐ: If this switch is pressed when winding in a load, the boom will move in the direction of swing to a position immediately above the load.



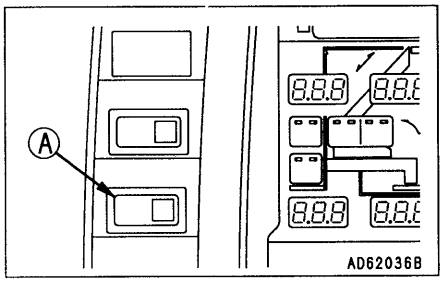
2. MAIN WINCH CONTROL LEVER

⚠ WARNING

When winding in a load, operate swing free switch Ⓐ when the load comes off the ground, and release the switch after the load is clear of the ground.

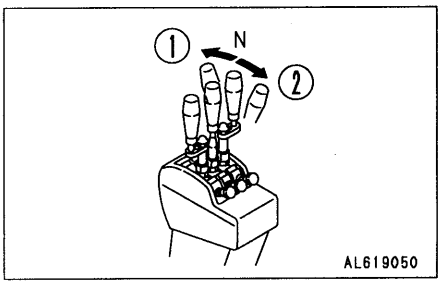


This is used to operate the main winch.
Position ①: Wind out
Position ②: Wind in
N position: The boom is stopped and held at the same position.
Swing free switch Ⓐ: If this switch is pressed when winding in a load, the boom will move in the direction of swing to a position immediately above the load.



3. BOOM HOIST CONTROL LEVER

This is used to raise or lower the boom.
Position ①: LOWER
Position ②: RAISE
N position: The boom is stopped and kept at the same position.



REMARK

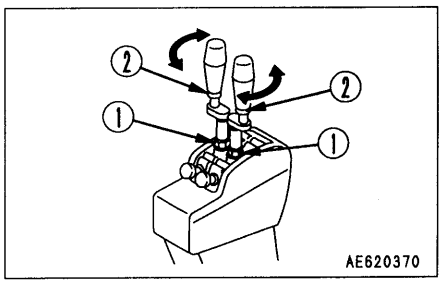
Swing control lever, boom hoist control lever, auxiliary winch control lever and power tilt jib control lever can be adjusted as follows.

ADJUSTING OF LEVER SPACE

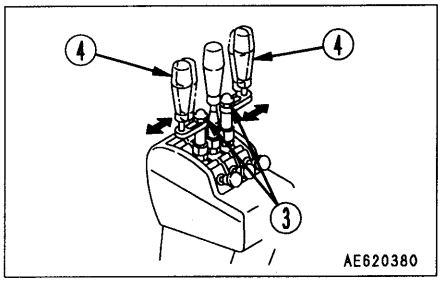
⚠ WARNING

After adjusting the levers, tighten the adjust nuts securely and check that they are not loose.

1. Swing lever and boom hoist control lever
   Loosening the adjust nut ① and turning the lever ② allow to set the 25 mm adjust margin freely.



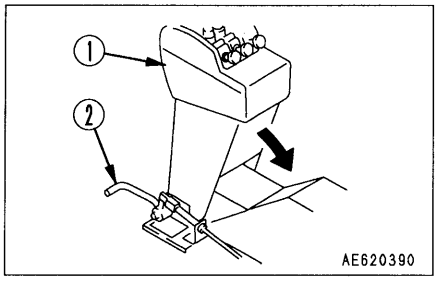
2. Auxiliary winch, power tilt jib control lever
   Loosening the adjust nut ③ and sliding the lever ④ allow to set the 8 mm adjust margin freely.



ADJUSTING LEVER STAND NEUTRAL POSITION

Follow the below procedure for adjusting the lever stand neutral position

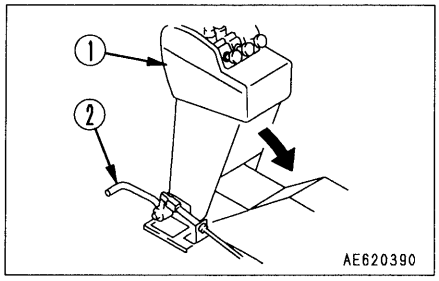
1. Depress the lock release pedal ②.
2. Move the lever stand ① to desired position and release the lock cancel pedal ② from that position.
   The lever stand ① is fixed at that state.



ADJUSTING LEVER STAND GETTING ON AND OFF POSITION

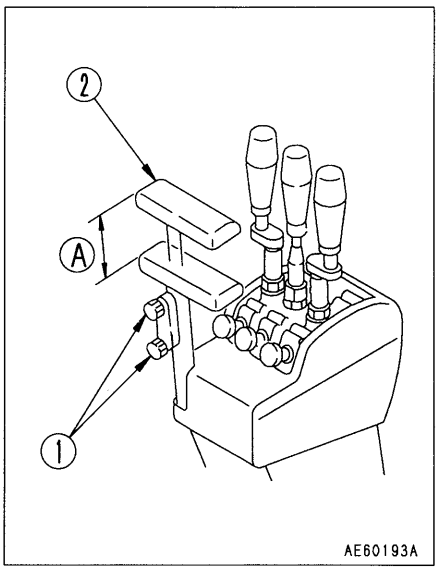
The lever stand ① can be brought down backward so as to stand in way.

1. Depress the lock release pedal ②.
2. Move the lever stand ① backward and release the lock cancel pedal ②.
   The lever stand ① is fixed at that state.

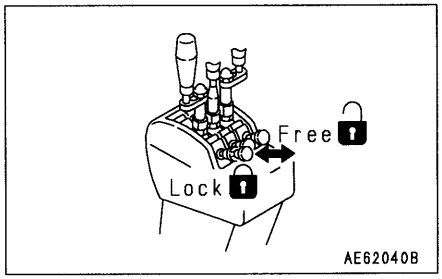


ADJUSTING THE WRIST REST (MOUNTING THE CONTROL LEVER TO LEFT OR RIGHT)

1. Loosening the adjust nut ① and sliding Ⓐ the wrist rest ② allow to set the 75 mm adjust margin freely.
2. After adjusting the wrist rest height, tighten the adjust nuts ① securly and check that the wrist rest is fixed.



4. AUXILIARY WINCH CONTROL LEVER LOCK KNOB



⚠ WARNING

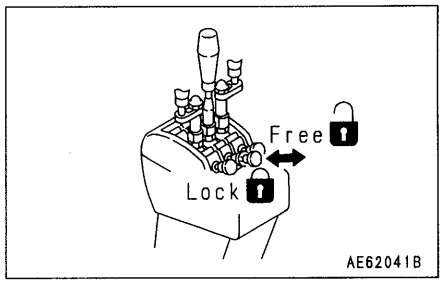
When not using the auxiliary winch, always place the lever at the neutral position and apply the lock.

This knob is used to lock the auxiliary winch control lever.

REMARK

When setting to the FREE position, pull up until the lock knob stops. When applying the lock, push the lock knob down and check that the winch control lever is locked.

5. MAIN WINCH CONTROL LEVER LOCK KNOB



⚠ WARNING

When not using the main winch, always place the lever at the neutral position and apply the lock.

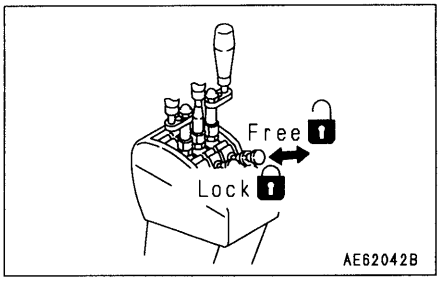
This knob is used to lock the main winch control lever.

REMARK

When setting to the FREE position, pull up until the lock knob stops.

When applying the lock, push the lock knob down and check that the winch control lever is locked.

6. HOIST CONTROL LEVER LOCK KNOB



⚠ WARNING

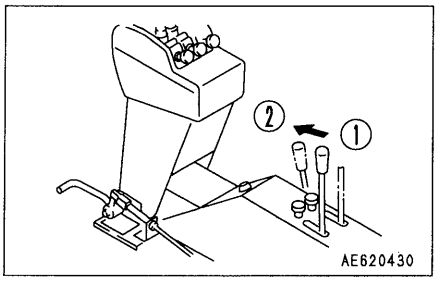
When not carrying out operations, always place the hoist control lever at the neutral position and apply the lock.

This knob is used to lock the hoist lever.

When setting to the FREE position, pull up until the lock knob stops.

When applying the lock, push the lock knob down and check that the winch control lever is locked.

7. AUXILIARY CLUTCH LEVER



This is used to operate the clutch for the auxiliary winch.

① ON: The auxiliary winch clutch is engaged. For normal operations, place the lever in this position.

② OFF:The auxiliary winch clutch is disengaged.
Set the lever to this position for free-fall operations.

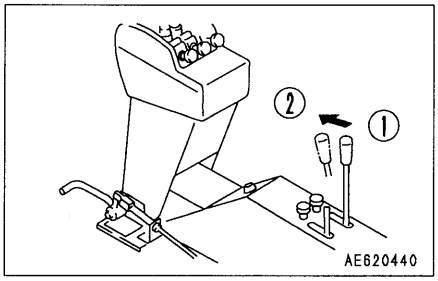
NOTICE

When carrying out operations with the main winch, always lock this lever at the ON position. When setting the clutch lever to the OFF position, always depress the auxiliary winch brake pedal.

REMARK

When moving the clutch lever from the ON position to the OFF position, push the lever down and to the front. When returning it from the OFF position to the ON position, pull the head of the lever back lightly.

8. MAIN CLUTCH LEVER



This is used to operate the clutch for the main winch.

① ON: The main winch clutch is engaged. For normal operations, place the lever in this position.

② OFF:The main winch clutch is disengaged.
Set the lever to this position for free-fall operations.

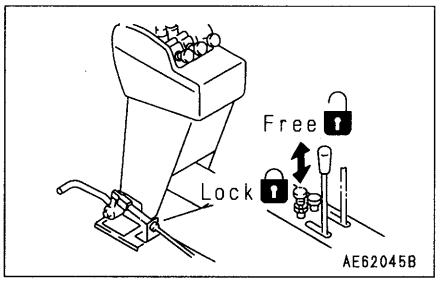
NOTICE

When carrying out operations with the main winch, always lock this lever at the ON position. When setting the clutch lever to the OFF position, always depress the main winch brake pedal.

REMARK

This machine is mounted with the free fall inter lock, so if the main winch brake pedal is not depressed, the lever can not be set to front "OFF". Pull the lever when returning "OFF" to "ON".

9. AUXILIARY CLUTCH LEVER LOCK KNOB

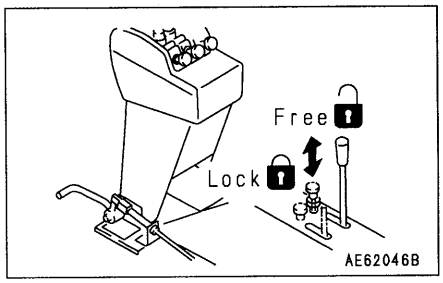


⚠ WARNING

- **When not carrying out operations, always operate this knob to lock the auxiliary clutch lever.**
- **When moving the clutch lever from the OFF position to the ON position, always operate the lever fully to the rear and check that it is at the ON position, then slowly release the winch brake pedal.**
  When releasing the pedal, apply the lock to the clutch lever.

This knob is used to lock the auxiliary clutch lever.

10. MAIN CLUTCH LEVER LOCK KNOB

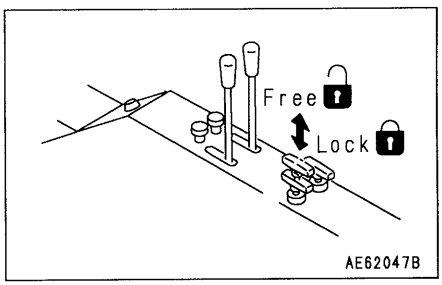


⚠ WARNING

- **When not carrying out operations, always operate this knob to lock the main clutch lever.**
- **When moving the clutch lever from the OFF position to the ON position, always operate the lever fully to the rear and check that it is at the ON position, then slowly release the winch brake pedal.**
  When releasing the pedal, apply the lock to the clutch lever.

This knob is used to lock the main clutch lever.

11. AUXILIARY WINCH DRUM LOCK KNOB



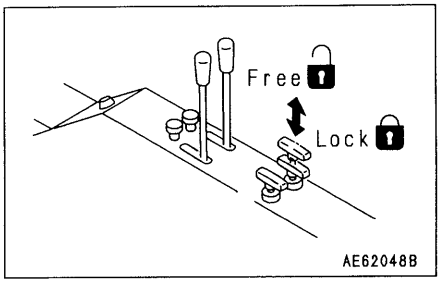
This knob is used to lock the auxiliary winch drum.

LOCK: The drum can only rotate in the winding-in direction.
FREE: The drum can rotate in both directions.

REMARK

When setting the drum lock to the FREE position, wind in the winch slightly before operating the knob. To set the knob to the FREE position, turn the knob counterclockwise and push it in.

12. MAIN WINCH DRUM LOCK KNOB

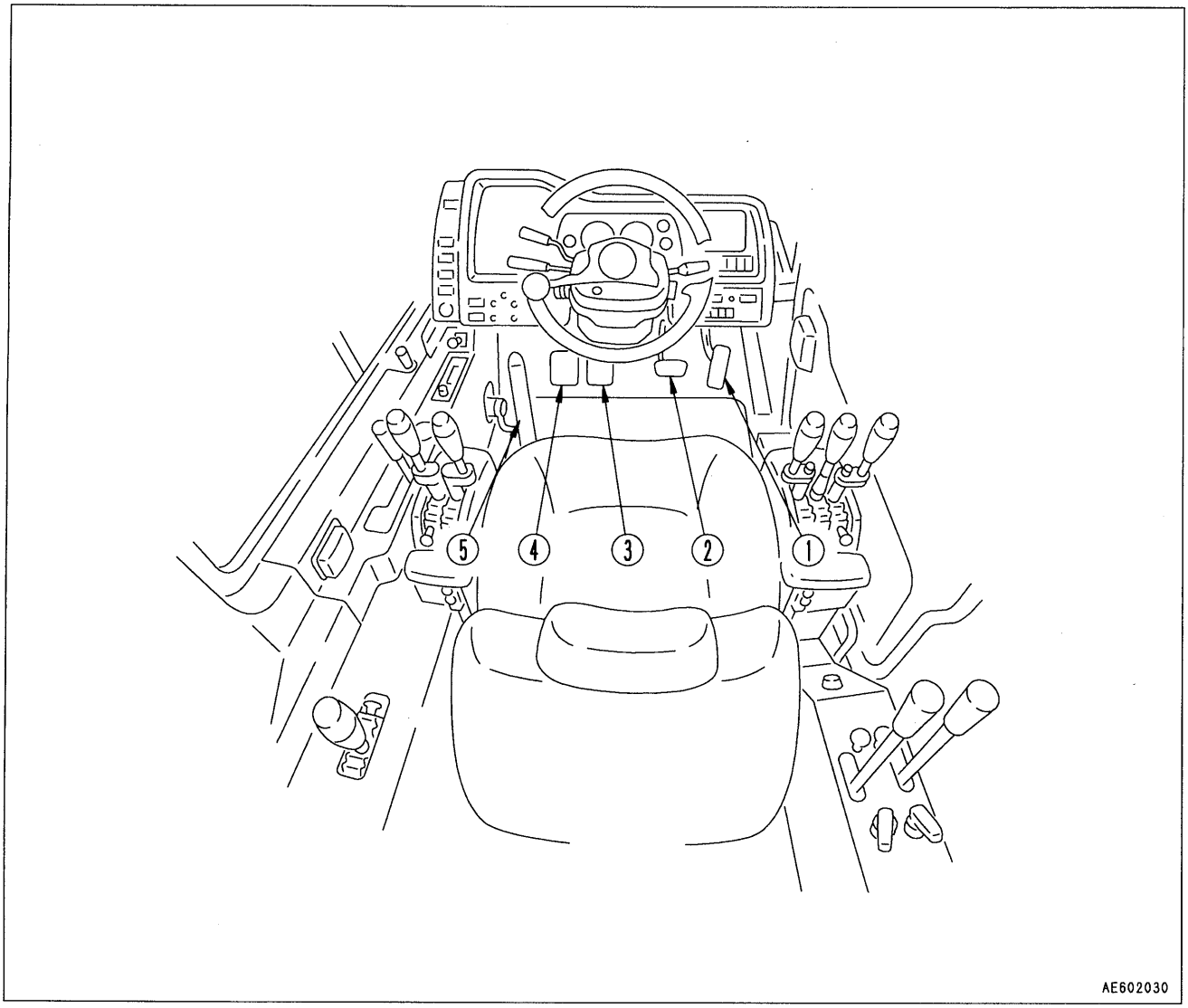


This knob is used to lock the main winch drum.
LOCK: The drum can only rotate in the winding-in direction.
FREE: The drum can rotate in both directions.

REMARK

When setting the drum lock to the FREE position, wind in the winch slightly before operating the knob. To set the knob to the FREE position, turn the knob counterclockwise and push it in.

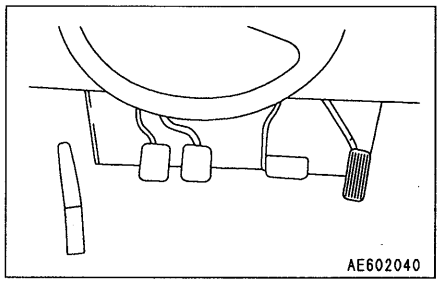
11.5 PEDAL GROUP



1. ACCELERATOR PEDAL

This is used to adjust the engine speed.

This pedal can be operated freely to adjust the engine speed from low idling to high idling.

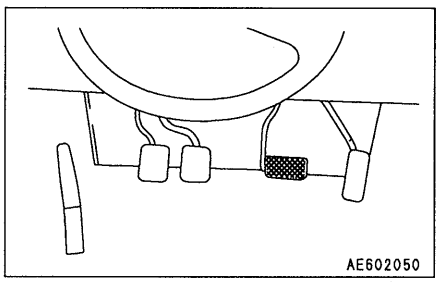


2. BRAKE PEDAL

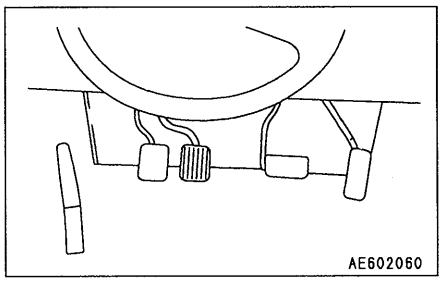
⚠ WARNING

Do not put your foot on this pedal unless necessary.

This is used to brake the machine when traveling.



3. MAIN WINCH BRAKE PEDAL



⚠ WARNING

When moving the clutch lever from the OFF position to the ON position, always operate the lever fully to the rear and check that it is at the ON position, then slowly release the winch brake pedal.
When releasing the pedal, apply the lock to the clutch lever.

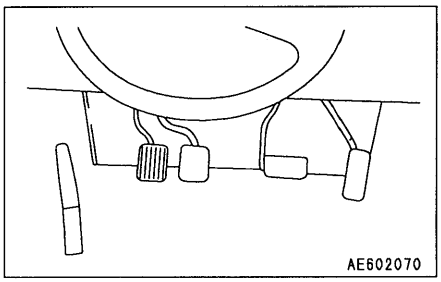
This pedal is used to brake the main winch.

Use the brake pedal to control the down speed during free-fall operations.

NOTICE

During normal operations, when operating the main winch clutch lever, always keep your foot on the main winch pedal to control the movement.

4. AUXILIARY WINCH BRAKE PEDAL



⚠ WARNING

When moving the clutch lever from the OFF position to the ON position, always operate the lever fully to the rear and check that it is at the ON position, then slowly release the winch brake pedal.
When releasing the pedal, apply the lock to the clutch lever.

This pedal is used to brake the auxiliary winch.

Use the brake pedal to control the down speed during free-fall operations.

NOTICE

During normal operations, when operating the auxiliary winch clutch lever, always keep your foot on the auxiliary winch pedal to control the movement.

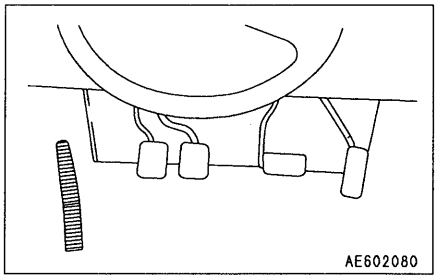
5. TELESCOPE/AUXILIARY WINCH CONTROL PEDAL

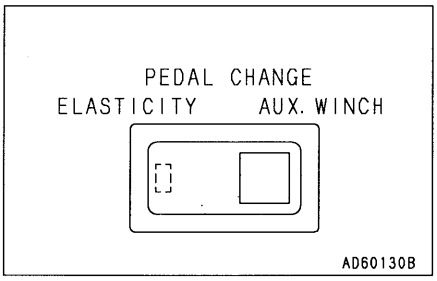
⚠ WARNING

Do not put your foot on this pedal unless necessary.

This pedal is to carry out boom telescope and auxiliary winch control. Switch between boom telescope control and auxiliary winch control using pedal switch.

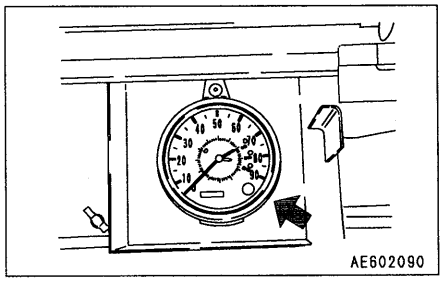
With option, this pedal causes another action. Use this pedal as needed.


AE602080



AD60130B

11.6 TACHOGRAPH



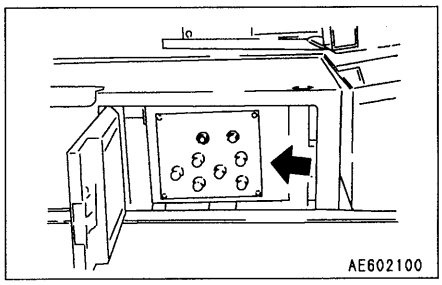
This displays the time, travel speed, and travel distance.

A clock and speedometer are included in the unit, and the records for the travel speed, travel distance, and operator shifts (distinguished by the key) can be printed out on paper.

NOTICE

When washing the tachograph, close the cover so as not to be splashed water.

11.7 OUTRIGGER CONTROL PANEL



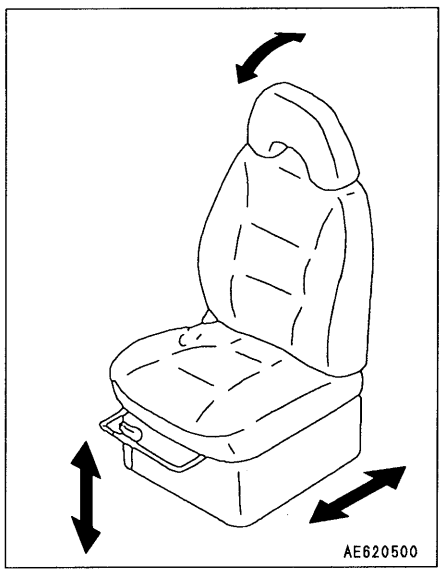
This is used to operate the outrigger from outside the operator's compartment.

For details of operation, see "12.17 OUTRIGGER OPERATIONS".

REMARK

This control panel provides with a switch for accelerator high idle set.

11.8 OPERATOR'S SEAT



The operator's seat can be adjusted for forward/backward, reclining, up and down and tilt.

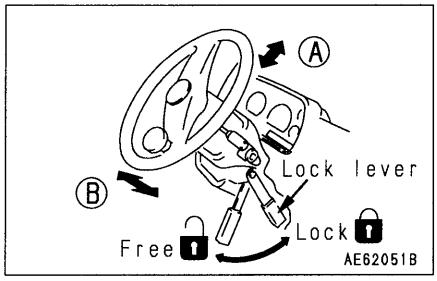
For adjusting the operator's seat, see "12.1.3 ADJUSTING BEFORE OPERATION, ADJUSTING OPERATOR'S SEAT".

11.9 STEERING WHEEL

⚠ WARNING

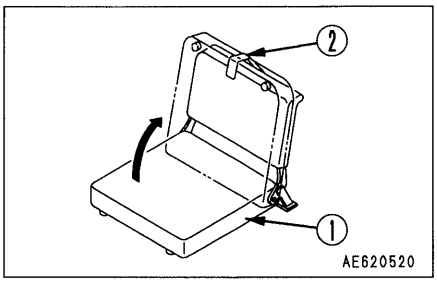
After adjusting, set the lock lever securely to the LOCK position.

If the lock lever is set to the FREE position, the angle and height of the steering wheel can be adjusted.
Ⓐ Adjustment amount for angle: 8°
Ⓑ Adjustment amount of height: 30 mm (1.2 in)



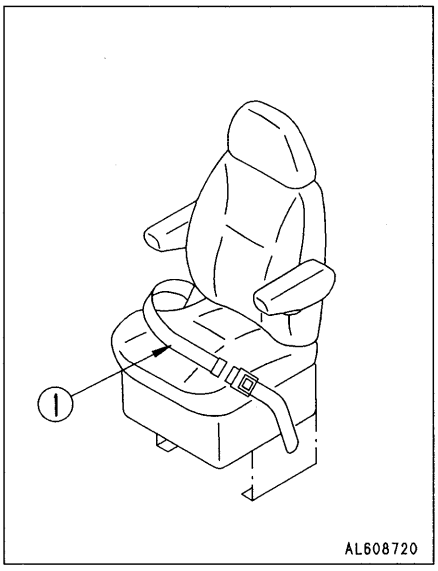
11.10 ASSISTANT'S SEAT

Pull the cushion of the assistant's (seat) ① up and fix it with the stopper belt ② to set full reclining seat.



11.11 SEAT BELT

Apply the seat belt ① for safety when traveling. For using the seat belt, see "12.1.3 ADJUSTING BEFORE OPERATION, ADJUSTING OPERATOR'S SEAT".



11.12 FUSE BOX

NOTICE

When replacing the fuse, always turn off the power (turn the starting switch to the OFF position).

The fuses protect the electrical components and wiring from burning out.
If the fuse is corroded, or there is white powder on it, or the fuse is loose in the fuse holder, replace it.

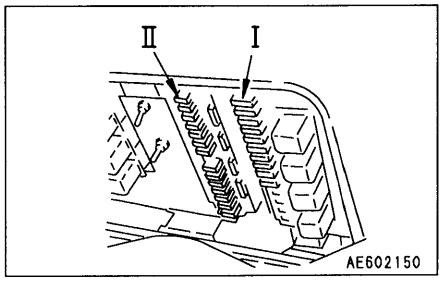
When replacing the fuse, always replace it with the correct fuse (see below).

11.12.1 FUSE CAPACITY AND THE NAME OF CIRCUIT

- **Fuse box I, II (in cab)**

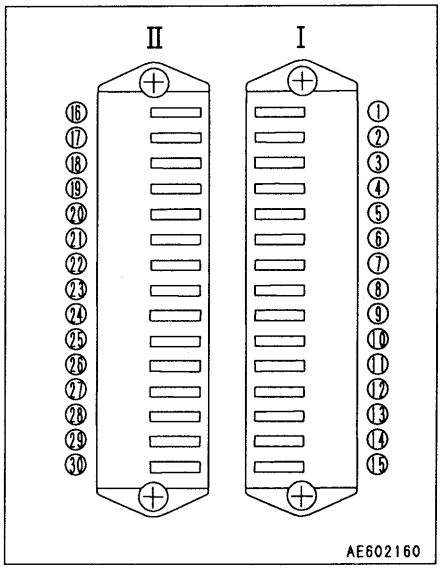
Fuse box I

No.	Capacity	Name of circuit
①	10 A	M.D.T(SW)
②	10 A	OSS (SW)
③	10 A	STM (jib)
④	10 A	PTO
⑤	10 A	Jib extend/stow
⑥	10 A	Cigarette lighter
⑦	20 A	Air conditioner
⑧	10 A	Wiper
⑨	10 A	Work lamp
⑩	10 A	Winch & emergency steering
⑪	–	–
⑫	(10 A)	Motor-operated mirror (option)
⑬	(10 A)	TV camera (option)
⑭	–	Spare (F2)
⑮	–	Spare (F3)

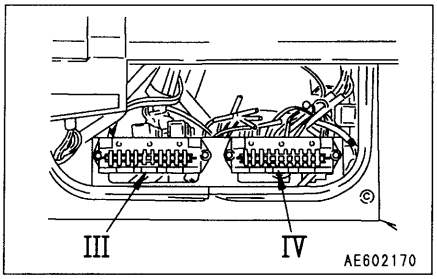


Fuse box II

No.	Capacity	Name of circuit
⑯	10 A	Starter
⑰	10 A	Light & turn
⑱	10 A	Horn
⑲	10 A	Room lamp, step lamp
⑳	10 A	Radio, air conditioner
㉑	10 A	M.D.T(NSW)
㉒	10 A	OSS(NSW)
㉓	–	Spare (F1)
㉔	10 A	Transmission control
㉕	10 A	Emergency gear shift
㉖	10 A	Parking brake power
㉗	10 A	Exhaust brake power
㉘	10 A	Steering brake power
㉙	10 A	Suspension
㉚	10 A	Monitor power

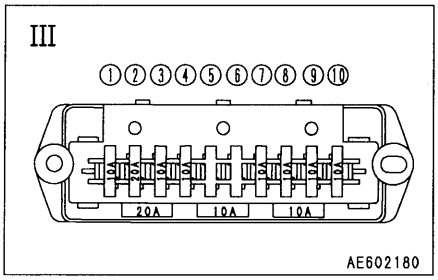


- **Fuse box III, IV (rear side of the hydraulic tank)**



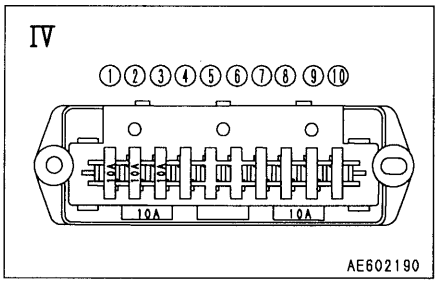
Fuse box III

No.	Capacity	Name of circuit
①	10 A	Engine stop motor
②	20 A	Head small lamp
③	10 A	Turn signal
④	10 A	MDT power (primary)
⑤	–	Spare (F1)
⑥	–	Spare (F2)
⑦	10 A	Stop lamp
⑧	10 A	Back lamp
⑨	10 A	Transmission control
⑩	10 A	Lower outrigger



Fuse box IV

No.	Capacity	Name of circuit
①	10 A	MDT power (primary)
②	10 A	Auto grease
③	(10 A)	Retarder (option)
④	(10 A)	Service lamp (option)
⑤	(10 A)	Electric-stowed mirror stay (option)
⑥	–	Spare (F3)
⑦	–	Spare (F4)
⑧	–	Spare (F5)
⑨	–	Spare (F6)
⑩	–	Spare (F6)



11.12.2 PRECAUTIONS WHEN ADDING ELECTRICAL COMPONENTS

⚠ WARNING

If the electrical component system is changed, there is danger that some abnormality may occur in the machine control. Please have any electrical components installed by your Komatsu distributor.

When adding electrical components, please contact your Komatsu distributor.

11.12.3 SLOW BLOW FUSE

A slow blow fuse, which acts in the same way as an ordinary fuse, is installed in the power source circuit from the battery.
If there is no abnormality in the fuse but the following problems occur, the slow blow fuse has melted, so check for the cause of the problem, and carry out any necessary repairs before replacing the slow blow fuse.

- **SYMPTOMS WHEN SLOW BLOW FUSE MELTS**

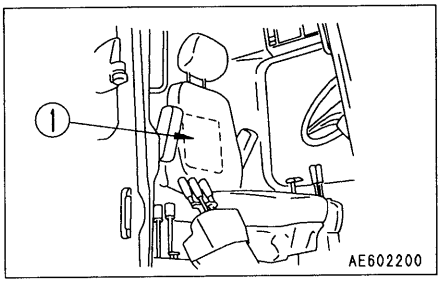
1) When the starting switch is turned to the ON position, the battery relay is not switched.
2) When the clearance lamp, room lamp, horn, or hazard lamp switches are turned ON, the lamps do not light up or the horn does not sound. When the radio switch is turned on, no sound comes from the radio.

- **ASSEMBLY POSITION OF SLOW BLOW FUSE**

The slow blow fuse is in the battery relay (2 places) inside the battery relay box.
(The battery relay secondary side and the battery direct line.)

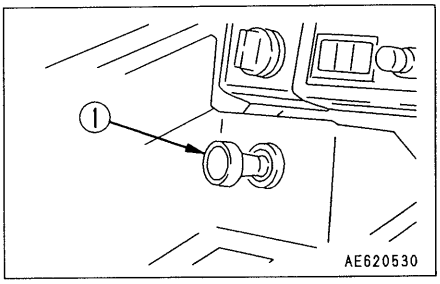
11.13 STORAGING PLACE OF THIS MANUAL

Keep this manual into the operator's seat rear pocket ① so as to take it out immediately when needed.



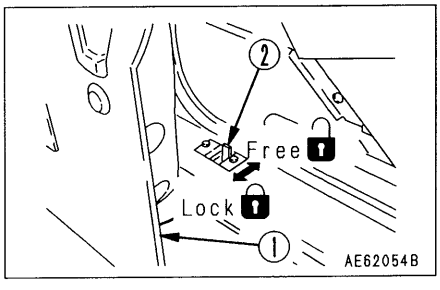
11.14 TAKING OFF POWER

Removing the cigarette lighter ① allows to use it for 24V power. The maximum electric current is 10A(240W).

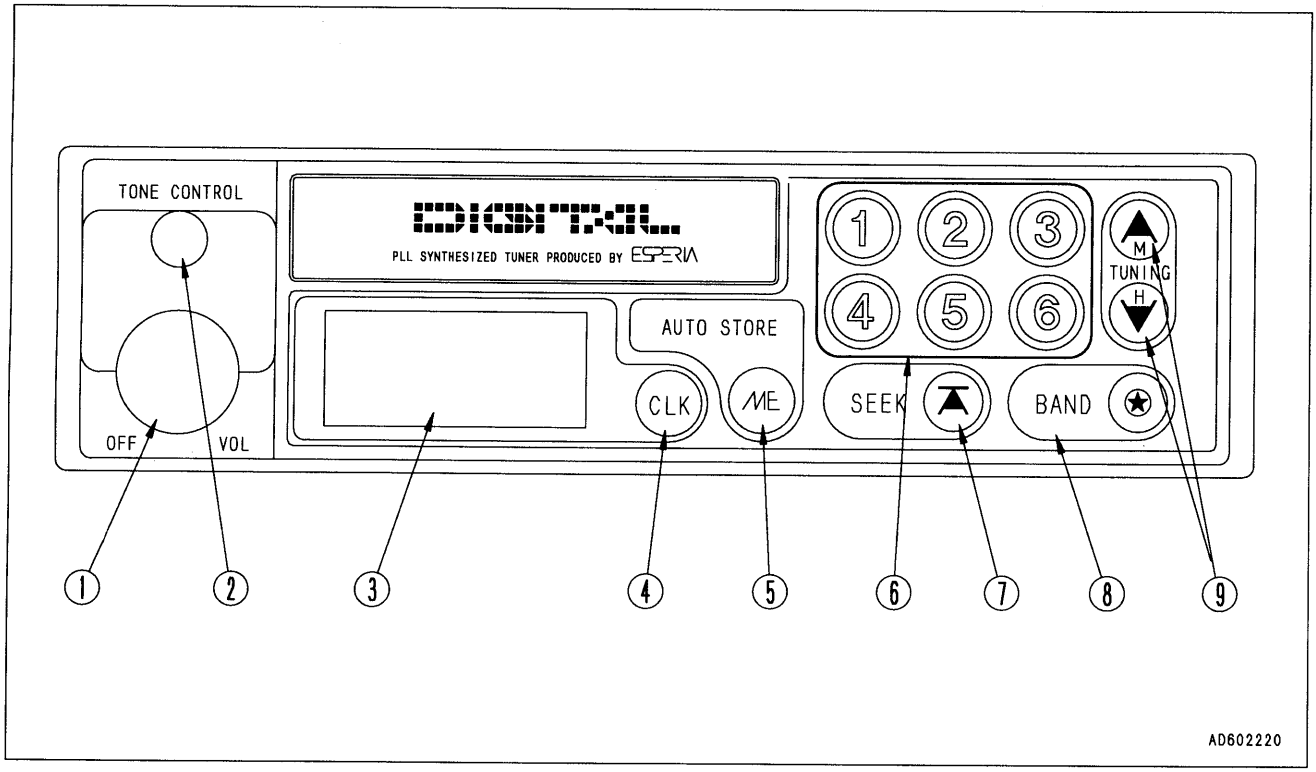


11.15 DOOR OPEN LOCK

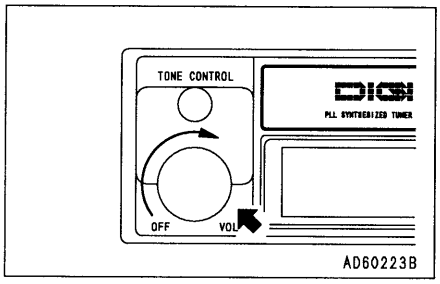
Door ① is opened and is held by the lever ②.



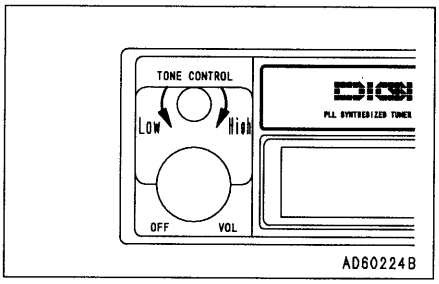
11.16 CAR RADIO
11.16.1 EXPLANATION OF PARTS



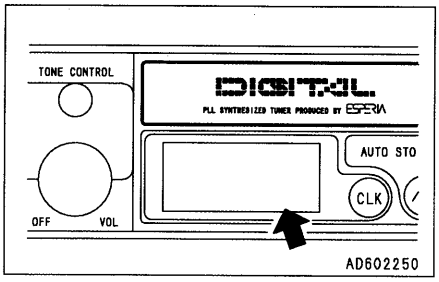
1. POWER SWITCH/VOLUME CONTROL KNOB
Push this knob to switch the radio on.
Turn the knob clockwise to increase the sound, and counterclockwise to reduce it.



2. TONE CONTROL KNOB (TONE)
Turn this knob clockwise from the center position to emphasize the high sounds, and counterclockwise to emphasize the low sounds.

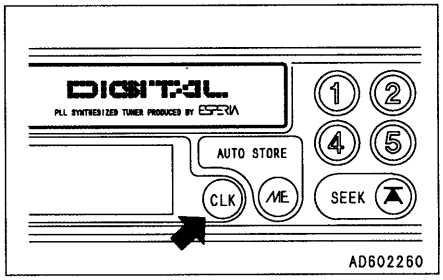


3. DISPLAY
This displays the frequency, time, and operation modes.



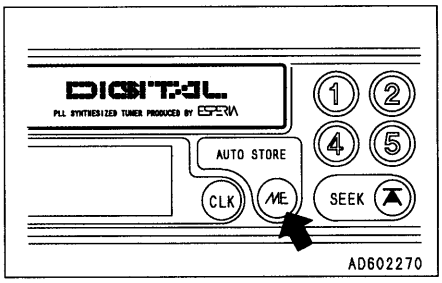
4. CLK(clock button)/(displaying frequency)

When this button is pressed, the display changes to clock. When pressed again, frequency is displayed.



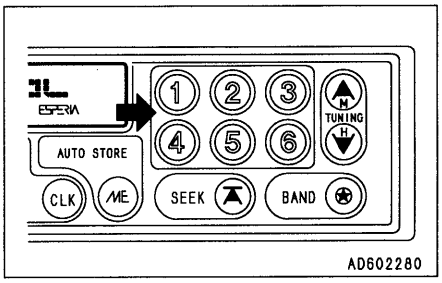
5. ME

The preset stations are called in turn by pressing this button. When the desired broadcasting station is reached, press this button again, and it stops at that station. Pressing the button for 2 seconds changes to automatic memory.



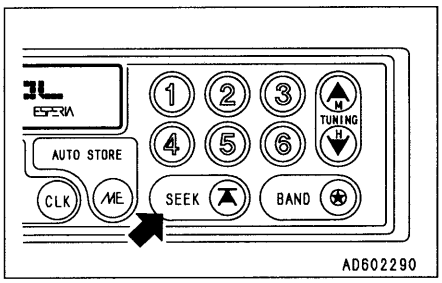
6. PRESET BUTTON (1, 2, 3, 4, 5, 6)

These buttons can be used to preset FM or MW(AM) to each button. (For the method of presetting, see "11.16.2 METHOD OF USE".



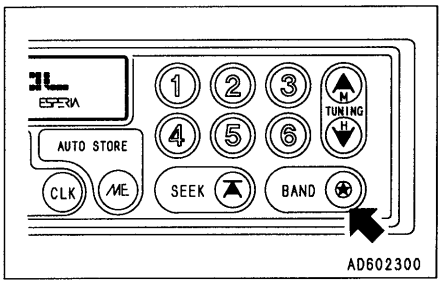
7. SEEK

The receivable station is picked up by pressing the "SEEK" switch, then the selector will automatically stop at that position.



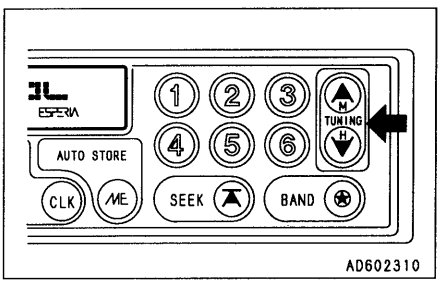
8. BAND SELECTOR SWITCH

The band between FM and MW(AM) switches by pressing the "BAND" switch. The reception band and the reception frequency are displayed on the display.



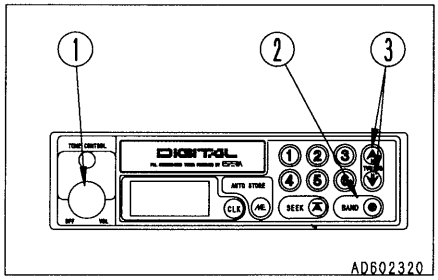
9. TUNING SWITCH

The frequency becomes higher by the "TUNING" button and decrease when pressing the button. When keeping the switch pressed, the frequency changes sequentially.



11.16.2 METHOD OF USE

1. Turn the ignition key to ACC or ON, and then turn the power ① of the radio to ON.
2. Set the "BAND" switch ② to MW(AM) or FM.
3. Select the broadcasting station using the preset switch or the tuning switch ③.
4. Adjust the volume and tone quality as desired.
5. When turning off the radio, turn the ●VOL knob to the left until a click sounds.

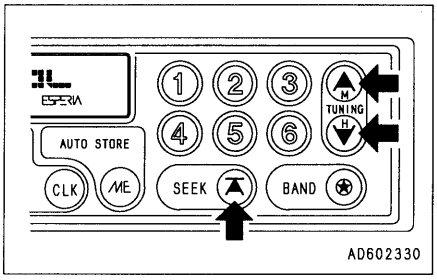


METHOD OF AUTOMATIC TUNING

The frequency becomes higher and the receiptable station is picked up, then the selector will automatically stop.

METHOD OF MANUAL TUNING

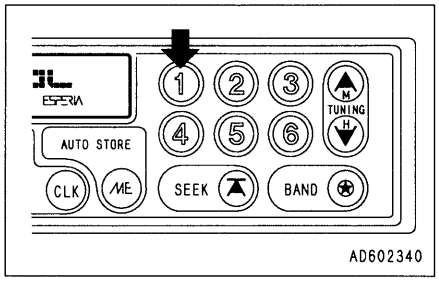
The frequency becomes higher by pressing , and becomes lower by pressing of the "TUNING" button. When keeping the button pressed, the frequency changes sequentially.



METHOD OF SETTING PRESET BUTTONS

(1) Select the desired station to preset. Select MW (AM) using the "BAND" button, and select FM using "TUNING" button, then select the frequency of the broadcasting.

(2) Keep the button at the desired number pressed for 2 seconds. The same number as the button is displayed on the display, and the preset is completed.

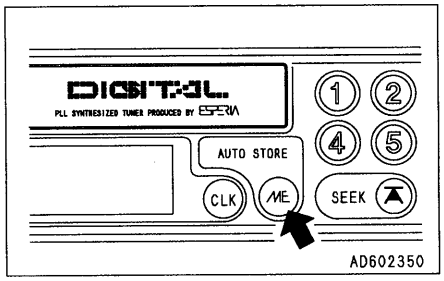


(3) Repeat the step (1) and (2), and preset the other stations.

- Similarly, when you want to memory the other station to already preset switch, repeat the steps (1) and (2).
- If the power supply cuts because of replacing the battery or other reasons, the preset setting is cleared. Preset the stations again.
- It is possible to preset 6 stations for AM (MW) and 6 stations for FM.

METHOD OF AUTOMATIC MEMORY

The receiptable broadcasting station at your site are called in turn by pressing "ME" button for 2 seconds and they are automatically memorized in the preset memory.



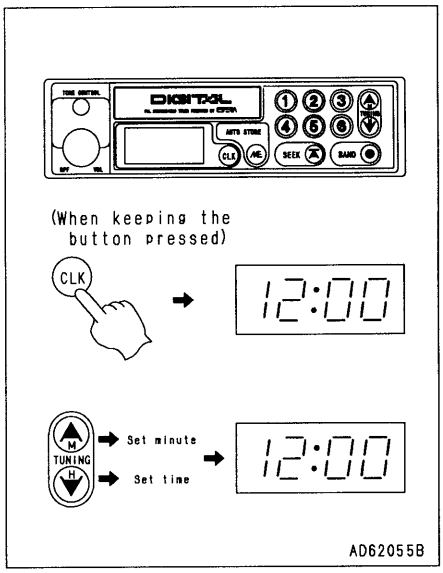
AUTOMATIC SWITCHING RECEPTION OF MONAURAL/STEREO

When the radio wave of receiving FM stereo signal is weak (such as when receiving at the area or the mountainous region that are far from the broadcasting stations), stereo is switched to monaural automatically to decrease the noise. If the stereo broadcasting becomes strong, monaural switches to stereo broadcasting automatically.

ADJUSTING TIME

(1) Turn the ignition key to ACC or ON and the power supply of the radio to ON. If the frequency is displayed on the display, change the display to the clock using the CLK button.

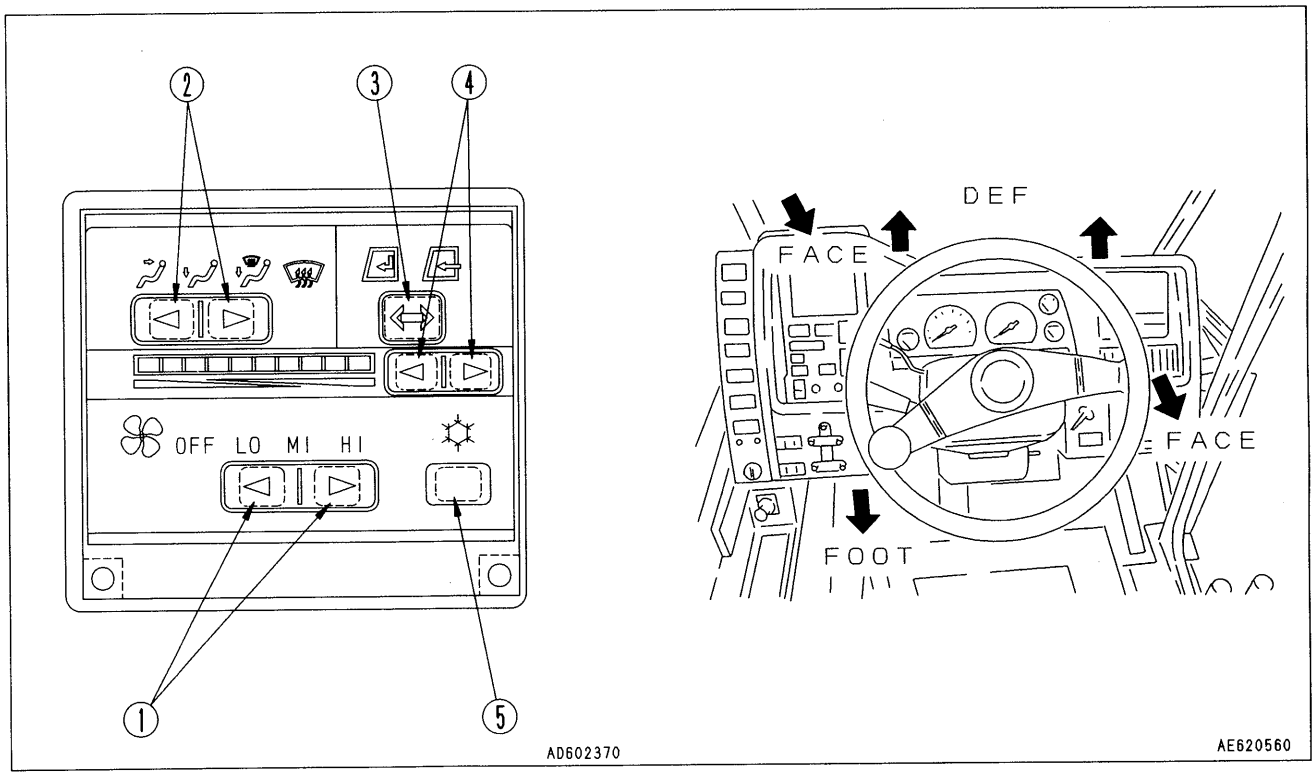
(2) When keeping the "CLK" button pressed and pressing button allows ▽ to set time or pressing button allows △ to set minute.



11.16.3 PRECAUTIONS WHEN USING

- Retract the antenna when traveling in places with a low overhead height.
- For safety reasons, when operating, keep the sound to a level where you can enjoy the sound but still hear the sound from outside vehicles.
- If water gets inside the speaker case or car radio (auto tuning), it may cause a serious problem, so do not let water get on these parts.
- Do not wipe the knobs or buttons or any other parts with solvents such as benzene or thinner. Always wipe with a soft dry cloth (in cases of extreme dirt, use alcohol on the cloth).

11.17 AIR CONDITIONER
11.17.1 NAMES OF PARTS ON CONTROL PANEL AND



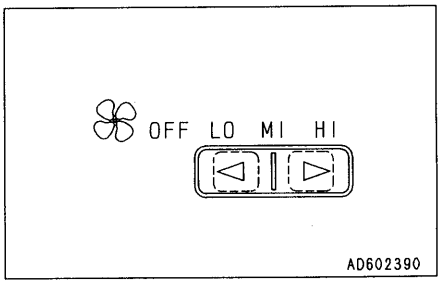
THEIR FUNCTIONS

1. FAN SWITCH

This switch allows the wind volume to adjust to the 3 levels.

▷ : When pressing the switch, the right side of the display currently lit up lights up.

◁: When pressing the switch, the left side of the display currently lit up lights up.

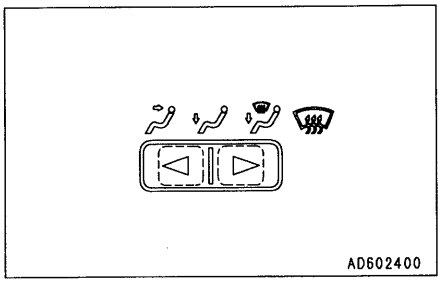


2. MODE SELECTOR SWITCH

This switch is used for switching the bleeder.

▷ : When pressing the switch, the right side of the display currently lit up lights up.

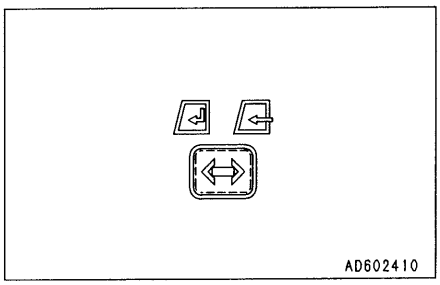
◁: When pressing the switch, the left side of the display currently lit up lights up.



3. MODE SELECTOR SWITCH

This switch is used for switching the inner air circulation and the open air inlet.

The inner air circulation or the open air inlet is displayed by lighting up the light emitted diode on the upper of the switch. When this switch is pressed, the light changes to other and the intake air is switched.

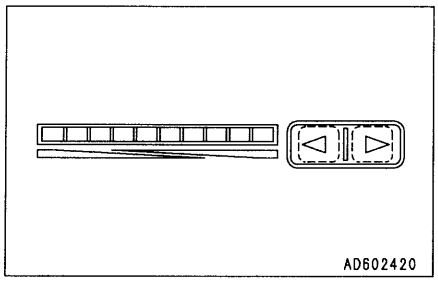


4. ADJUSTING TEMPERATURE

This switch is used for adjusting the temperature without steps from low to high temperature.

The temperature is displayed by temperature level light emitted diode as the criterion of the bleeding air.

▷ : When pressing the switch, the light emitted diode moves to the right of the light (orange), and the air is warmed.
◁: When pressing the switch, the light emitted diode moves to the left of the light (green), and the air is cooled.

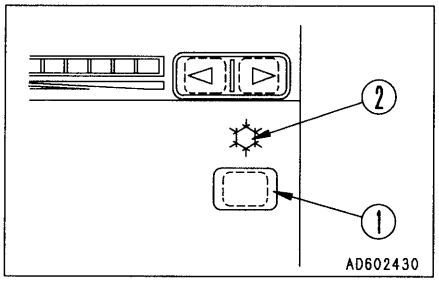


5. AIR CONDITIONER SWITCH

This switch is used to activate or stop the function of cooling or removing humidity.

The air conditioner lamp ② lights by setting the fan switch to "ON" and pressing the air conditioner switch ①.

When pressing it again, the air conditioner display goes out.



⚠ CAUTION

- **Always stop the air conditioner and the engine before leaving the machine.**
- **Leaving the air conditioner in "Inner air circulation" for a long time may cloud the windows, and cause poor visibility. Set the air conditioner to "Open air inlet" normally.**
- **If the temperature of the air conditioner is set too low, the outside of the window may be wet with dew, and this causes poor visibility. Adjust the temperature of the bleeding air.**
- **When any abnormality of the air conditioner function is found, immediately contact Komatus or your Komatsu distributor.**

11.17.2 METHOD OF OPERATION

Using stage \ Switch		Fan switch	Air conditioner switch	Temperature adjusting switch	Inner/open air selector switch	Mode selector switch
Cooler	Rapid	HI	ON	left half green	inner	FACE
	Normal	HI-LO	ON	more than one green	open	FACE
Humidity removing heater		HI-LO	ON	more than one orange	open	FOOT
Heater	Rapid	HI	OFF	right half orange	inner	FOOT
	Normal	HI-LO	OFF	more than one orange	open	FOOT
Defroster		HI	ON	right half orange	open	DEF
Ventilation		HI-LO	OFF	more than one green	open	FACE

- When the open air is dirty or when rapid cooling is needed, set the switch to "Inner air circulation".
- For health, the difference between the temperature of the cab and the open air is said that the optimum temperature is 5° – 6°C difference between the cab and the open air. Do not lower the temperature more than needed.
- Your eyes may become irritated by smoking. If you smoke inside the cab, open the window somewhat or set the air conditioner to "Open air inlet".
- Do not set the "FACE" mode to the "Inner air circulation" for a long time.

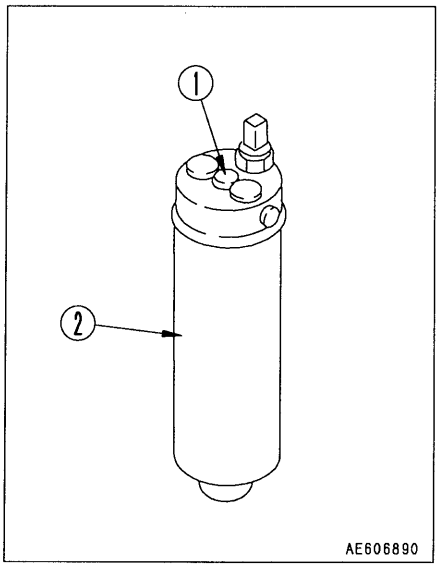
11.17.3 CHECKING AIR CONDITIONER

Carry out 2 times in a year (spring and autumn).

CHECKING REFRIGERANT (GAS) VOLUME

⚠ WARNING

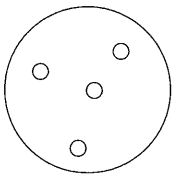
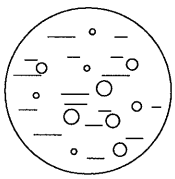
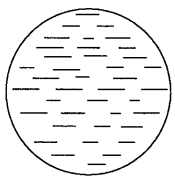
The refrigerant use in the cooler is colorless and odorless, and is harmless in the atmosphere, but if the fluid gets into your eyes or on to your hands, it may cause loss of sight or frost bite, so never loosen any parts of the refrigerant circuit.



Activate the cooler, and touch the high pressure portion and the low pressure portion (or the caps of the high pressure hose and the low pressure hose) by hand after 5 – 10 minutes. In this condition, observe the flow of the refrigerant gas (R134a) through the sight glass to check the gas volume.

Contact your Komatsu or your Komatsu distributor for inspection.

The sight glass is on the receiver at the side of the condenser.

The cooler condition	Normal	Abnormal	
The temperature of the high/low pressure pipe	The high pressure pipe is heated and the low pressure pipe is cold. The difference of temperature is clearly recognized.	The high pressure pipe is warm and the low pressure pipe is somewhat cold. There is little difference of temperature.	There is almost not the difference between the high pressure pipe and the low pressure pipe.
The sight glass condition	Almost the whole area of the glass is transparent. It becomes transparent when the engine rotation rises or falls although bubbles are recognized. 	The flow of bubbles are always recognized. Sometimes they are transparent or white. 	The flow of mistlike can be recognized. 
The condition of the connection of the pipes	Normal	There are some areas that are dirty with oil.	Some areas are significantly dirty with oil.
The condition of this cooler	The refrigerant gas is enough and normal. It can be used continuously.	Maybe there is some leakage. Contact Komatsu or your Komatsu distributor for inspection.	The refrigerant gas may have almost leaked and completely run out. Immediately contact Komatsu or your Komatsu ditributor for inspection.

CLEANING THE AIR CONDITIONER OPEN AND INNER AIR FILTER ELEMENTS

⚠ WARNING

When using pressurized air, wear safety goggles.

When using the air conditioner, clean the air filter elements.

Stop the air conditioner before cleaning the elements.

See "23.5 Every 100 hours service" for cleaning the open air filter, and "23.6 Every 250 hours service" for cleaning the inner air filter.

CHECKING THE COMPRESSOR BELT

Check for loosening and damage of the air conditioner compressor belt.

See "23.6 Every 250 hours service" for adjusting the tension of the compressor belt.

CLEANING THE AIR CONDITIONER CONDENSER

⚠ WARNING

Do not clean the condenser with the steam cleaner because the condenser is heated.

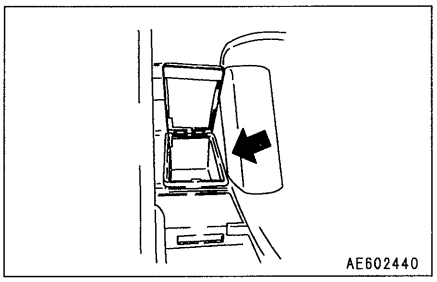
If the mud is stuck to the air conditioner condenser, the ventilating effect becomes poor and the cooling ability is down. In this case, clean the air conditioner condenser or brush the mud off. When washing with water, cover the electrical parts so as not to be directly splashed with water.

SERVICE AND MAINTENANCE IN THE OFF-SEASON

During off-season, run the air conditioner twice or three times in a month for several minutes so as not to run out of oil for each parts in the compressor. Also, check for the leaks of the refrigerant gas and loosening of the piping.

11.17.4 COOL BOX

When running the cooler, drinks or wet towels can be kept cool. Also, it has a keeping warm effect when running the heater.
Do not put the things that give out a smell, are easy-damaged or leaking things in this box. Do not use this box as a glove compartment.



11.18 MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) EXTERNAL PILOT LAMP (OPTION)

⚠ WARNING

If the red external pilot lamp lights up, lower the load immediately and operate the machine in the direction of the safe zone.

This lamp indicates to the crane man and other operators in the area the condition of the load and the safety function cancel condition.

Item \ Pilot lamp		Green	Yellow	Red
Load condition	Load ratio Less than 90%	○		
	90% to 100%		○	
	More than 100%			○
Safety condition	Overwinding			○
	Automatic stop cancel			○
	Jib setting mode			○

11.18.1 PRECAUTIONS WHEN USING EXTERNAL PILOT LAMP

⚠ WARNING

When traveling on public roads, remove the external pilot lamp.

- Use the external pilot lamp only inside the worksite.

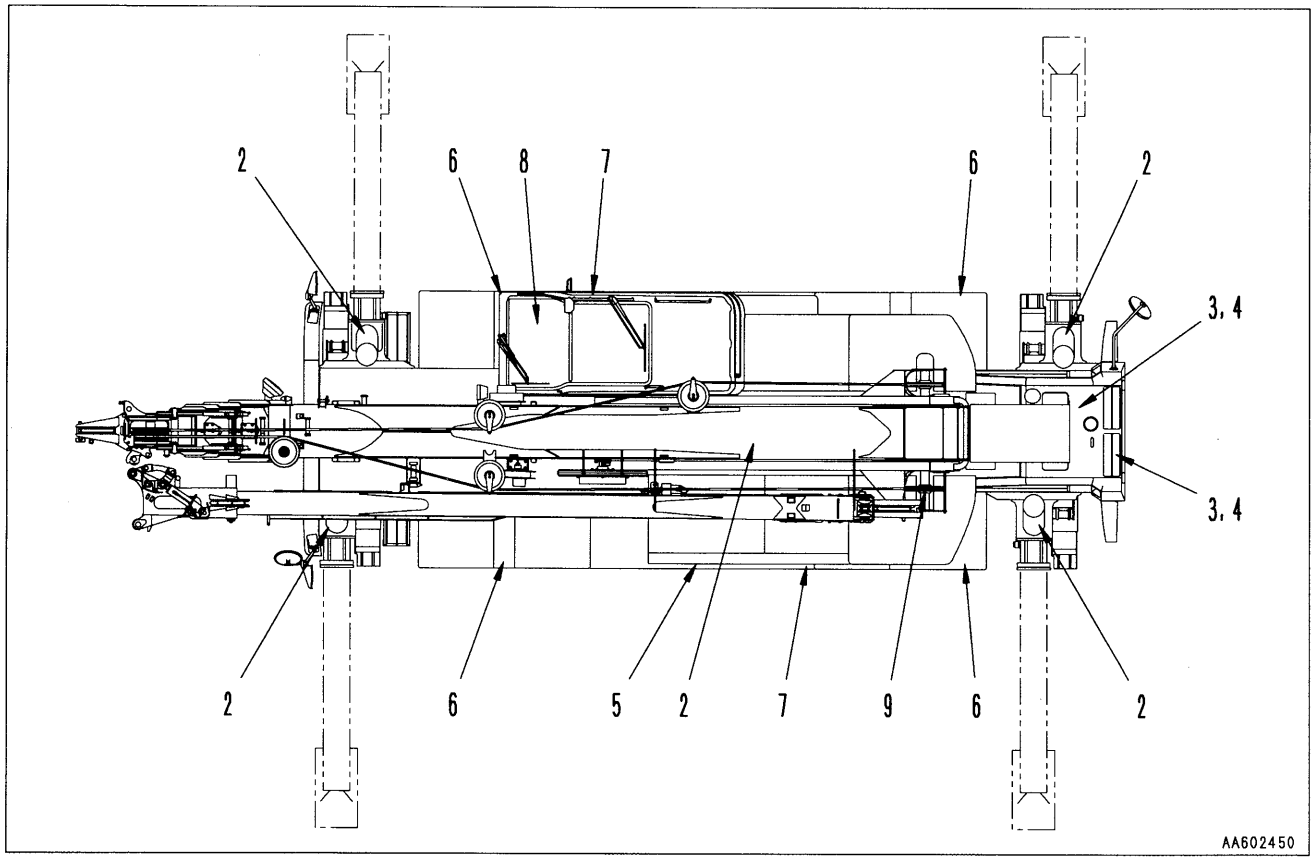
12.1 CHECK BEFORE STARTING ENGINE
12.1.1 WALK-AROUND CHECK

⚠ WARNING

Dust, oil leakage, or fuel leakage around parts of the engine which are at high temperatures may cause fire.
Check carefully and repair any abnormality, or contact your Komatsu distributor.

Before starting the engine, check around and under the machine for loose nuts and bolts, leakage of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system. Check for any play or loose electric wires or dust collected at places with high temperatures.

The checks in this section are checks which are carried out once only each day before starting the engine for the first time.



1. **Check for broken sensors**
   Check visually for any external damage to the boom length sensor, outrigger length sensor, and other sensor. If any abnormality is found, please contact your Komatsu distributor for inspection and repair.

2. **Check work equipment, cylinders, linkage, causes for damage, wear, and play**
   Check the work equipment, cylinder, linkage, and hoses for cracks, excessive wear, or play, and repair any abnormality.

3. **Remove dirt from around engine and radiator**
   Check for any accumulated dirt around the engine and radiator, and remove any dirt.

4. **Check for leakage of water or oil around engine**
   Check for any leakage of oil or coolant from the engine, and repair any abnormality.

5. **Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, joints**
   Check for any oil leakage, and repair the location of the oil leakage if any abnormality is found.

6. **Check for damage, wear to tires, loose mounting bolts**
   Check for any cracks or peeling of the tires. Tighten any loose wheel nuts. If any abnormality is found, carry out repair or replacement.

7. **Check for damage to handrails and step, check for loose bolts**
   Repair any damage and tighten any loose bolts.

8. **Check for damage to gauges, monitor, check for loose bolts**
   Check for any damage to the gauges and monitors, and replace if any abnormality is found. Clean any dirt off the surface.

9. **Check for wear, damage to wire rope**
   Check the wire rope for wear, twisting, kinks, deformation, and corrosion, and replace with new wire rope if any abnormality is found.

12.1.2 CHECK BEFORE STARTING

The items in this section are carried out once only before starting the engine for the first time each day.

GREASING

⚠ WARNING

Applying the grease more than needed causes the grease to drop on the winch cover, and it becomes slippery.
Apply the grease but not as much as to drop, and if it drops, wipe it off thoroughly.

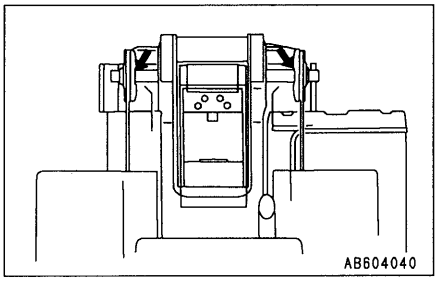
1. Using a grease pump, add grease through the grease fittings marked by arrows.

2. After greasing, wipe off any old grease that is forced out.

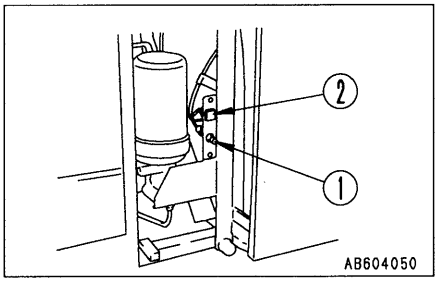
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Nippon Molybdenum	Nichimoly PC-1	1. Guide sheave
Dow Corning	Molycoat BR1-S	
Komatsu	G2-LI	2. Bottom centralized greasing point

1. Guide sheave (2 places)
Slide so that the whole shaft of the guide sheave is coated with grease.



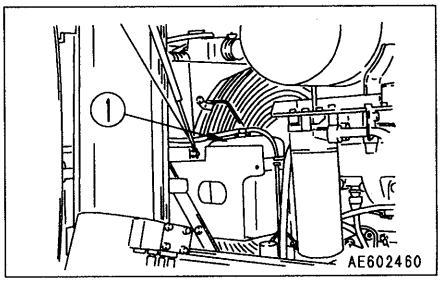
2. Bottom centralized greasing point (1 place)
- Tie rod pin
- King pin
- Steering cylinder pin
- Suspension cylinder pin
- Suspension spring hanger
- Suspension spring pin
- Rear steering lock pin



(1) Push greasing switch ① at the side of the outrigger control panel on the left side of the machine.
(2) Lamp ② above switch ① lights up to indicate that greasing is completed, but keep switch ① pressed for a further 2 – 3 seconds.

REMARK
- Check that there is grease in the grease cartridge before pushing the greasing switch.
- Always use the special cartridge for the grease.
- If the grease cartridge becomes empty, air will enter the piping. Replace the cartridge before this happens.

CHECK COOLANT LEVEL, ADD WATER

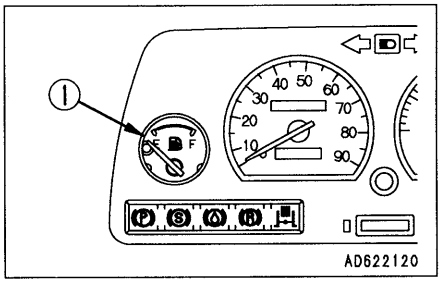


⚠ WARNING

Normally, do not open the radiator cap. When checking the coolant, always wait for the engine to cool down, and check the sub-tank.

1. Open the engine side cover at the right side of the machine, and check that the coolant is between the FULL and LOW marks on sub-tank ①. If the level is low, add water to the FULL level through the water filler of sub-tank ①.
2. After adding water, tighten the cap securely.
3. If the sub-tank is empty, check for water leakage, then check the level of the water in the radiator. If the level is low, add water to the radiator, then add water to the sub-tank.

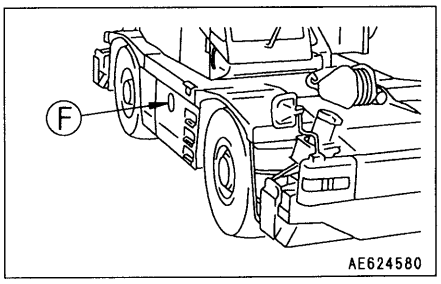
CHECK FUEL LEVEL



⚠ WARNING

To prevent fire, make sure that the fuel does not overflow when you add fuel.

1. Check the fuel level on fuel gauge ①.
2. After completing operations, add fuel through fuel filler port Ⓕ to fill the tank.



For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

3. After adding fuel, tighten the cap securely.

Fuel tank capacity : 300 ℓ (79.2 US gal, 66 UK gal).

CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

1. Open the right side cover of the engine.

2. Pull out dipstick Ⓖ and wipe the oil off with a cloth.

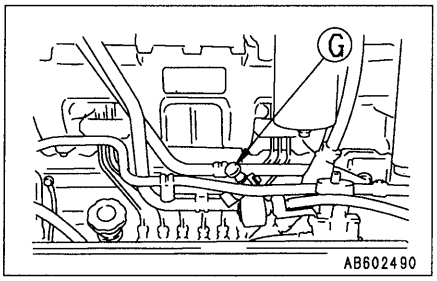
3. Insert dipstick Ⓖ into the oil filler guide again, then pull it out.

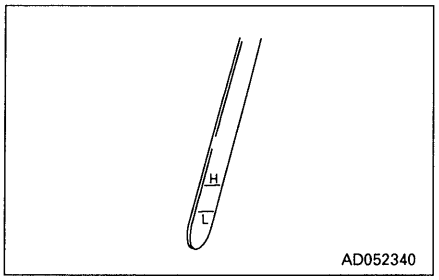
4. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler port F. Swing the upper structure to the side when doing this.

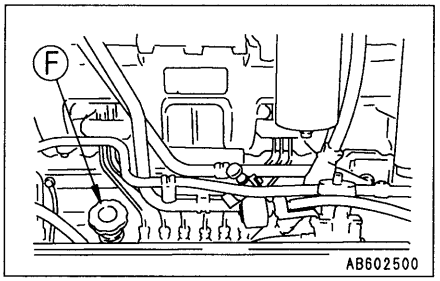
   For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

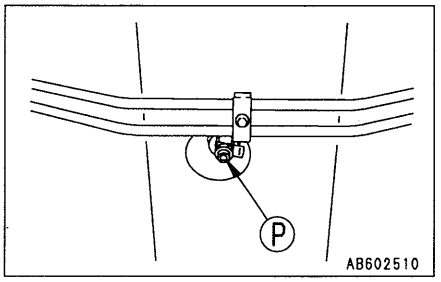
5. If the oil is above the H mark, drain the excessive engine oil from drain plug Ⓟ, then check the oil level again.

6. If the oil level is correct, tighten the oil filler cap securely.









REMARK

- When checking the oil level after operating the engine, stop the engine, then wait for at least 15 minutes before starting to check. When checking, make sure that the machine is not at an angle. Set it horizontal then check the oil level.
- When adding oil, remove dipstick Ⓖ from the gauge guide to release the air from the inside the crankcase.

CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

⚠ WARNING

- **When removing the oil filler cap, the oil may spurt out, so turn the cap slowly to release the internal pressure, then remove the cap carefully.**
- **When adding oil, if too much oil is added and the oil goes above the top line on the level gauge, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from drain plug Ⓟ.**

NOTICE

Do not add oil above the top mark. This will damage the hydraulic circuit and cause the oil to spurt out.

1. If the machine is not in the travel posture shown in the diagram on the right, start the engine, run the engine at low idling, set the machine to the travel posture, then stop the engine.
   For details of the travel posture, see "12.4 PREPARATIONS BEFORE MOVING MACHINE OFF".

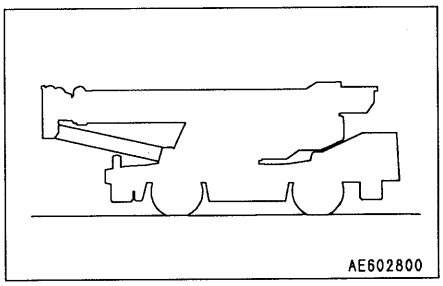
2. Check the oil level with sight gauge Ⓖ to confirm that it is between the top and bottom lines.

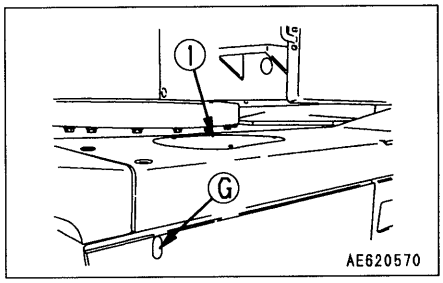
3. If it is below the bottom line, remove cover ① and add hydraulic oil through oil filler port Ⓕ.

When checking and refilling the hydraulic oil, please contact your Komatsu distributor.

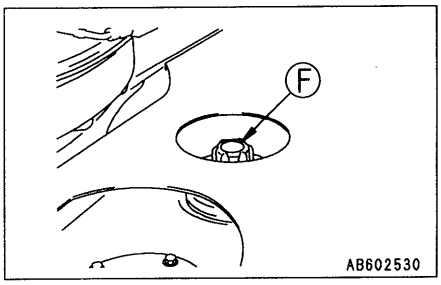
The recommended oil for HO46-HM

Supplier	Oil
Esso	Uni-power SQ46K
Mobil	Mobil DTE25
Shell	Hydroconto oil K


AE602800

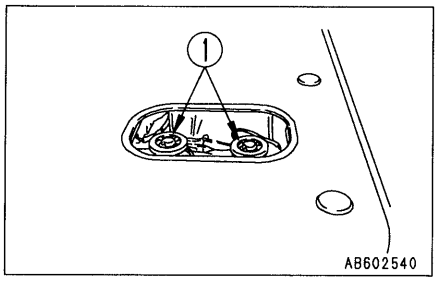


AE620570



AB602530

CHECK TRAVEL BRAKE FLUID LEVEL, ADD FLUID



⚠ WARNING

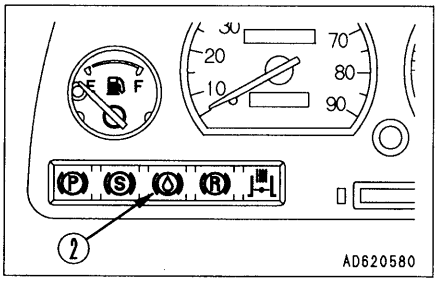
When adding brake fluid, be careful not to mix mineral oil with the brake fluid. Even if only a small amount of mineral oil (engine oil, etc.) is in the brake fluid, the rubber parts in the brake fluid line will show an abnormal change in their properties, and this will lead to defective operation of the brakes. When adding brake fluid, always use a container that is used exclusively for brake fluid.

1. Check that the fluid level is at the MAX level in brake fluid tank ① (2 places).

2. If it is not up to the MAX level, add brake fluid (FMVSS DOT5 <Glycol type> or equivalent).

NOTICE

When brake fluid decreases excessively, check the brake pads wear, and brake fluid leakage from the brake piping.



For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

REMARK

If the fluid level is too low, brake oil level caution lamp ② in the meter portion lights up and the alarm buzzer sounds to warn the operator.

NOTICE

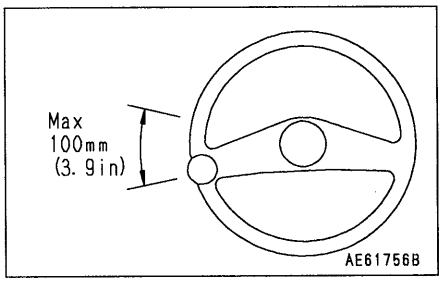
When adding brake fluid, be careful not to get the brake fluid on any painted surface. The brake fluid may attack the paint.

CHECK PLAY OF STEERING WHEEL

When measuring the play of the steering wheel, start the engine, and jack up the front wheels before measuring.

Standard: Max. 100 mm (3.9 in)

If the play is not within the standard, or the steering wheel vibrates abnormally or pulls or is heavy, please contact your Komatsu distributor for repair.



CHECK INFLATION PRESSURE OF TIRES

Measure the tire inflation pressure before starting operation when the tires are cold.

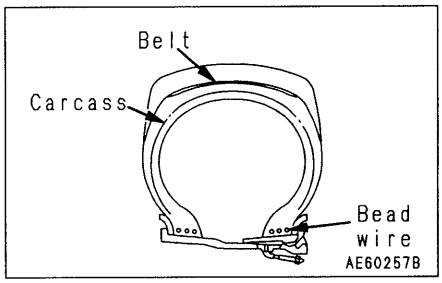
If the tire inflation pressure is too low, it will cause overload; if it is too high, it will cause cuts and shock bursts, so make sure that the tire inflation pressure matches the values in the table below.

	Inflation pressure
When traveling	0.9 MPa (9.0 kgf/cm^2)
When working	0.9 MPa (9.0 kgf/cm^2)

REMARK

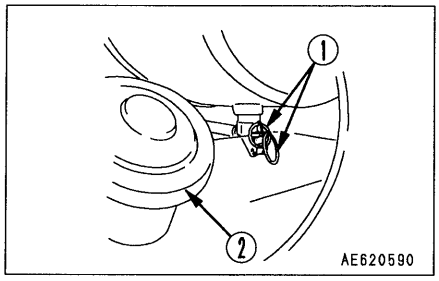
If tires have any of the defects 1) to 5) listed below, they must be replaced with a new tire to ensure safety.

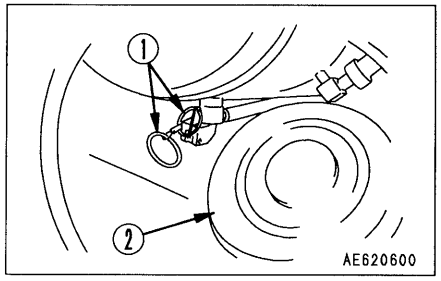
1) Tires where the bead wire is cut, bent, or greatly deformed
2) Tires with advanced wear, which show signs of slipping
3) Tires where the carcass or belts are damaged
4) Tires in which the ply or belt has separated
5) Tires which show deterioration, deformation, or growth in damage, and which are judged to be unable to withstand use



DRAIN WATER FROM AIR TANK

After finishing operations, stop the engine, then open drain valve (fuel filler ② side) in the dry tank and drain the water. In the same way, pull ring ① (each 2 places) in the wet tank to drain the water.



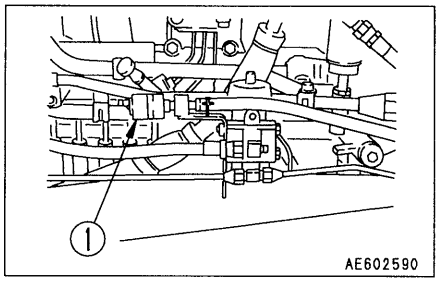


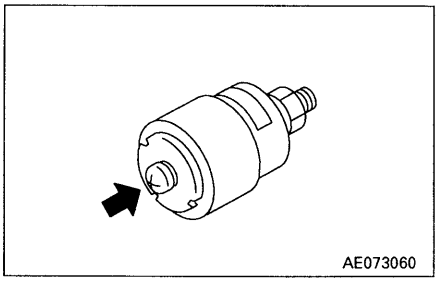
NOTICE

For machines equipped with an air dryer, check what is drained. If there is an abnormal amount of water or oil, replace the desiccant in the dryer or check for oil leaking up from the air compressor.

CHECK DUST INDICATOR

1. Check if the red piston has appeared in the clear portion of dust indicator ①.
2. If the red piston has appeared, immediately clean or replace the element.
   For details of the method of cleaning the element, see "23.2 WHEN REQUIRED".
3. After inspecting, cleaning, and replacing, press the knob of dust indicator ① to return the red piston to its original position.





CHECK BRAKING EFFECT

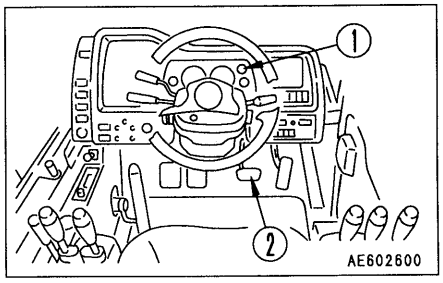
The stopping distance should be a maximum of 12 m (39 ft) when the machine travels at an initial speed of 35 km/h (22 MPH) on a flat, dry concrete surface.

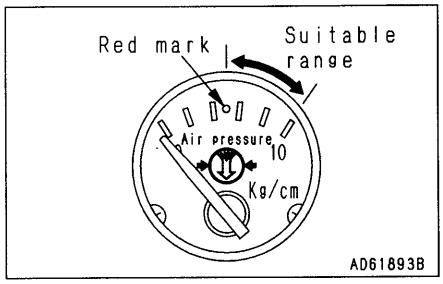
If the braking effect is poor, see "23.6 EVERY 250 HOURS SERVICE".

CHECK RISE IN AIR PRESSURE, CHECK EXHAUST SOUND FROM BRAKE VALVE

When the pressure inside the air tank is 0, check that it takes approx. 5 minutes to charge with air up to the range marked by the arrow on air pressure gauge ① with the engine at low idling, and less than 1.5 minutes when the engine is running at high idling.

If the rise in pressure is too slow, check for any leakage from the piping, and check the operation of the air compressor. Check also that the exhaust sound is normal when air is exhausted from the brake valve when brake pedal ② is depressed and then released.





REMARK

When the pressure is lowering, the buzzer sounds and the lamp inside the monitor lights up.
In addition, when the needle of the air pressure goes over the red mark, the buzzer and the lamp go off.

CHECK THAT FLASHING OF LAMPS IS NORMAL, CHECK FOR DIRT OR DAMAGE

CHECK THAT DIRECTION OF BACKUP MIRROR IS CORRECT, CHECK FOR DIRT OR DAMAGE

CHECK REFLECTORS AND NUMBER PLATE FOR DIRT OR DAMAGE

CHECK OPERATION OF HORN

CHECK ENGINE EXHAUST COLOR AND SOUND

CHECK OPERATION OF GAUGES

CHECK THAT ABNORMALITIES FROM ON PREVIOUS DAY HAVE BEEN REPAIRED

CHECK BRAKING EFFECT OF PARKING BRAKE

CHECK DOOR LOCK

CHECK OPERATION OF WIPERS, WINDOW WASHER, CHECK WASHER FLUID LEVEL

CHECK THAT STEERING MECHANISM

Check the turning of steering wheel and the movement of the tires.

CHECK WIRE ROPE

Check the holder at the end of the rope, check the winding- on condition, and check for contact between ropes.

CHECK OUTRIGGER CHECK VALVE

Check that there is no hydraulic drift of the jack cylinder when the outriggers are extended.

CHECK OPERATION OF MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) PANEL

For details, see "12.35 SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)".

CHECK OPERATION OF WORK EQUIPMENT

Check that the winding in and winding out of the winch, and the hoist, telescoping, and swing movement of the boom match the operation of the levers and pedals.

CHECK HOOKS

Check the movement of the bearings, check for deformation of the hooks, check that the stopper for the wire rope is normal.

CHECK THAT SWING BRAKE EFFECT IS CORRECT

CHECK MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

Check MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) operation as following procedures.

1. Turn the starting key ① to "START" position and start the engine.

2. Set PTO switch ② to the "WORK 1" position. Power of MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) switch turns ON.
   - When the PTO switch is set to the "WORK 1" position, the ALARM buzzer (PEE sound) sounds for two or three seconds.)

3. Set the crane operating mode switch to "Boom" and the carrier operating mode switch to "Outrigger".

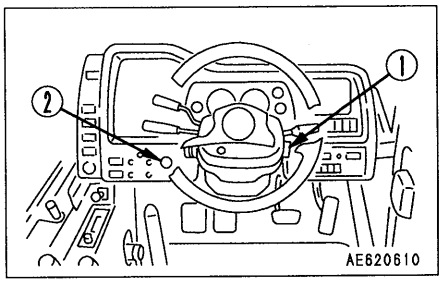
4. Slide the outrigger to the desired length and insert the lock pin.

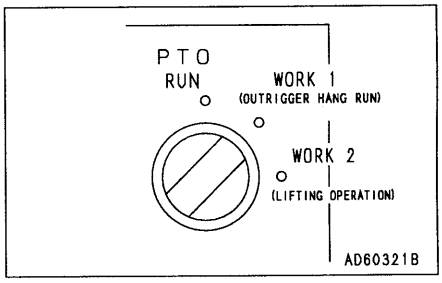
5. Follow the below items to check the outrigger extending width setting function.
   - Make sure that the lock pin position matches with the contents of the display on the panel.

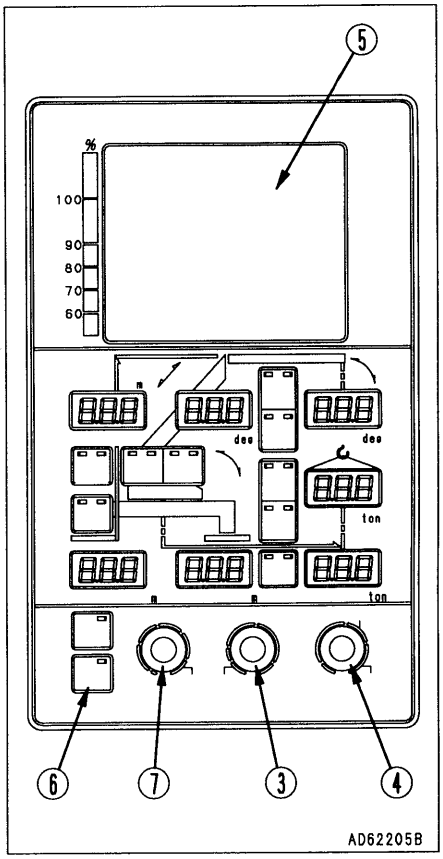
6. Check the outrigger setting by pressing the "SET" switch.

7. Check the wire rope hook number setting by pressing the "SET" switch.
   - For the items 6 and 7, when the "Setting" switch is pressed, the ALARM buzzer (PEE sound) sounds.

8. To check the automatic stop function, set the display mode switch to the "CHECK" position, and operate the below levers to check the following items.
   1) When the switch is set to "Check", all display area of the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel light up and buzzer sounds, then all lit up area go out and the buzzer stops. After that (3 – 5 seconds later), the display returns to normal.
   2) Check the "Name of machine", "Outrigger type" and "Jib specification" displayed on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel.
   3) The boom does not go down even when the boom hoist lever is operated.
   4) The boom does not extend even when the boom telescope lever is operated.
   5) The winch does not wind in even when the winch control lever is operated.
   6) The tilt does not down even when the auxiliary jib hoist lever is operated.
      (Only for the power tilt jib type machine : Mount the jib before carry out the jib working.)







REMARK

For items 3), 4), 5) and 6), operation to the reverse direction (safe side) is possible.

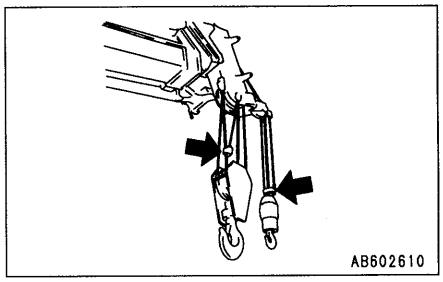
7) Check that the display area of the MOMENT LIMITER (OVER-LOAD PREVENTION SYSTEM) control panel is synchronized with the lever operation and is reversely displayed when operating each levers.
8) Check that the overwinding is reversely displayed when overwinding.
9) Check that the "Top Retract" stowing is normally displayed when extending the boom telescope cylinder.
10) Check that the automatic stop cancel is reversely displayed when canceling the automatic stop.

9. Set the display mode switch to "SWING" and use the following procedure to check that the display values of each sensors are normal.
   1) Check that the swing position display on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel matches with the machine condition when swinging. And when in front, check that the front position is displayed.
   2) Check that the boom length display value is [7.6m (24 ft 11 in)] when the boom length is at the minimum.
   3) Check that the boom length display value is [32.0m (104 ft 11 in)] when the boom length is at the maximum.
      After ensuring the items 2) and 3) move down the boom at the proper angle and length, and stop to operate. (At this point, do not stop automatically with overloading.)
   4) Wind in the auxiliary hook to just before the overwind position, wind out the main hook to just before the grounding position, and check that the actual load weight display value is [0.2 $\pm^{0.2}_{0.0}$ ton] = main hook when without loading.

10. If the above items can not be checked, or the displayed value is out of the standard value, contact your Komatsu or Komatsu distributor.

CHECK FUNCTION OF SAFETY DEVICES (OVERWIND PREVENTION SYSTEM)

Check that winding stops automatically and the alarm buzzer (PEE sound) sounds when the main and auxiliary hooks touches to the overwind weight. If it do not stop, always locate the cause and correct it.



CHECK BRAKING EFFECT OF WINCH BRAKE

Raise the maximum load for the number of lengths of rope, and check that it remains stopped when the clutch is disengaged.

CHECK EFFECT OF WINCH CLUTCH

Raise the maximum load for the number of lengths of rope, and check that the load can be raised and lowered.

CHECK ELECTRIC WIRING

⚠ WARNING

- **If the fuse blows frequently, or if there is any sign of a short circuit in the electric wiring, always investigate and repair the cause.**
- **If withered leaves, withered branches or withered grasses and other flammable things are collected around the battery, they could cause a fire. Always remove them thoroughly.**
- **Keep the upper face of the battery clean, and if any clogs with mud are found in the battery cab vent holes, wash them in water without soap and remove the clogs.**

Check for damage to the fuse and for signs of disconnections or short circuits in the electric wiring. Check also for loose terminals, and tighten if necessary.
Be particularly careful to check the following wiring.

- Battery
- Starting motor
- Alternator

Always check that there is no collection of flammable things around the battery and remove them.

When investigating and repairing the cause, please contact your Komatsu distributor.

CHECK BOOM TELESCOPIC WIRE CABLE

Check the boom telescopic wire cable for the damage, abnormal slack, abnormal tension, incorrect retraction and extension of the boom etc.

Especially check the following:

- Damage to the telescopic wire cable
- Looseness of the fixing nuts at the end of the telescopic wire cable, etc.
- Slack or over-tension of the telescopic wire cable

After checking, if abnormalities are found, consult Komatsu or your Komatsu distributor.

CHECK BOOM SLIDE PADS

Check the boom for smooth operation by extending and retracting the boom.

Especially check the following:

- Make sure extending and retracting of the boom takes place smoothly.
- When extending the boom to the maximum, be sure there are no abnormal bends at the connection of boom sections.
- Check for abnormal flaws on the boom slide pad surface.

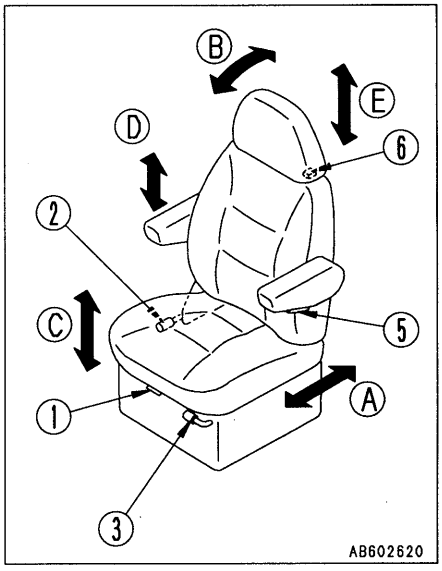
After checking, if abnormalities are found, consult Komatsu or your Komatsu distributor.

12.1.3 ADJUSTING BEFORE OPERATION

ADJUSTING OPERATOR'S SEAT

⚠ WARNING

- **Park the machine at safe place before adjusting the operator's seat,**
- **Adjust the operator's seat before starting operation or changing the operator.**
- **Adjust the seat so as to the brake pedal can be depressed fully when leaning on the back seat.**



Ⓐ **Fore-and-aft adjustment of seat**
Move lever ① to the right, set the seat to the desired position, then release the lever.

Amount of fore-and-aft adjustment: 120 mm (4.72 in) (6 stages)

Ⓑ **Adjusting reclining angle**
Pull lever ②, set the seat back to the desired position, then release the lever.

Adjusting reclining angle front 46° (6 stages) rear 54° (27 stages)

Ⓒ **Adjusting seat height and tilt**
Pull lever ③ up or down to set the seat to the desired height. Push down to adjust the height at the front, and pull up to adjust the height at the back.

Amount of adjustment: 60 mm (2.36 in) (4 stages)

Ⓓ **Adjusting the arm rest angle**
Turn the knob ⑤ to adjust the arm rest angle.

Amount of adjustment: 30° (front 20°, rear 10°)

Ⓔ **Adjusting the head rest up and down**
Push the lever ⑥ to set the head rest to the desired position.

Amount of adjustment: 100 mm (3.94 in)

SEAT BELT

⚠ WARNING

- **It is dangerous to fit or adjust the seat belt when traveling. Always put on the seat belt and adjust it before starting to travel.**
- **Always fit the lap belt so that it is across your hips. If you fit it across your stomach, there is danger of a powerful force being applied in the case of an accident.**

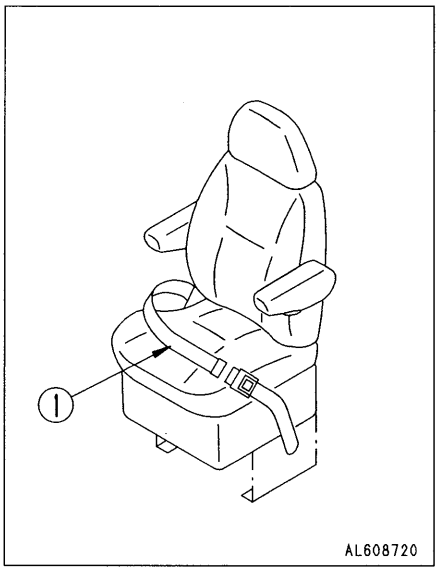
Method of fitting

1. Check that belt ① is not twisted, then insert the tongue into the buckle securely until there is a click.

2. Set the belt and plate straight, then pull the belt to adjust.

Method of removing

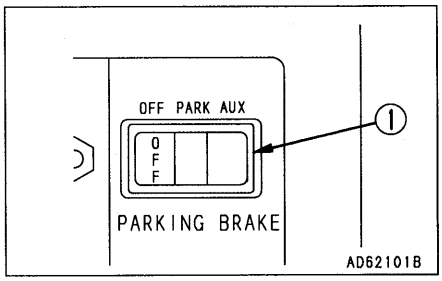
1. Press the red button on the buckle to release the belt.

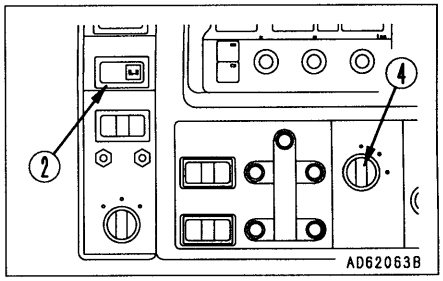


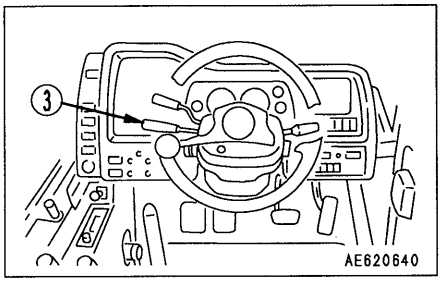
12.1.4 OPERATION, CHECK BEFORE STARTING ENGINE

⚠ WARNING

- **If the control levers are touched by accident, the machine may move suddenly. When standing up from the operator's seat, tip the control levers to the rear, make sure that the work equipment do not move and that the lock pin of the winch clutch lever in the LOCK position.**
- **Clean the dust collected on the starter, the alternator and the battery before starting the engine.**
- **Read this manual and "WARNING" labels before starting the engine, and follow them.**

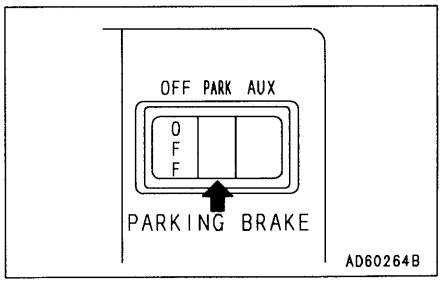




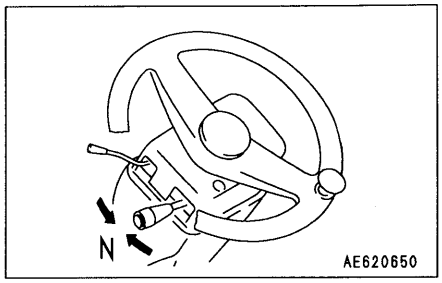


1. Check that parking brake switch ① is at the PARK position.

2. Check that swing break switch ② is at ON position.
   At this time, the lamp inside the switch lights up.

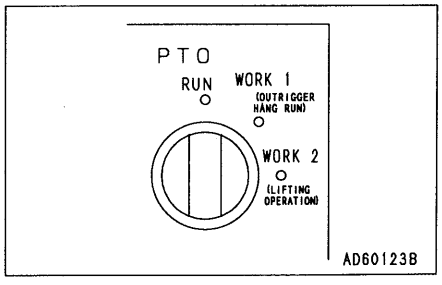


3. Check that gear shift lever ③ is at the N position.
   If the gear shift lever is not at the N position, the engine cannot be started.

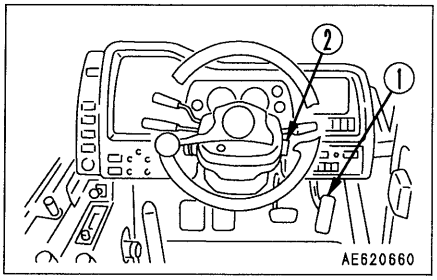


4. Check that PTO switch ④ is at the RUN position.

5. Check that the work equipment control levers are all at the HOLD position.



12.2 STARTING ENGINE
12.2.1 NORMAL STARTING



⚠ WARNING

- **Check that there is no person or obstruction in the surrounding area, then sound the horn before starting the engine.**
- **If any starting aid fluid is used for starting, there is danger of an explosion, so never use such starting aids.**

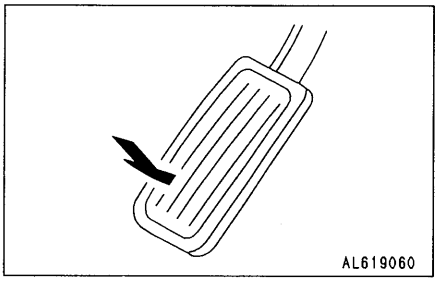
NOTICE

Do not crank the starting motor continuously for more than 20 seconds.
If the engine does not start, wait for about 2 minutes before trying to start again.

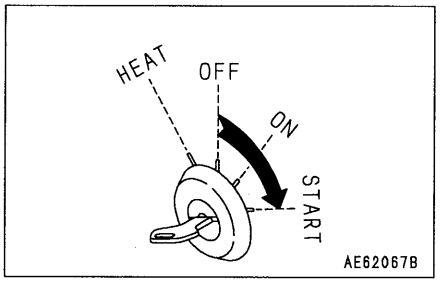
REMARK

If the gear shift lever is not at the N position, "N safety" is displayed on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) monitor panel and at the same time, the alarm buzzer (PICO-PICO sound) sounds, and the engine will not start. Set the gear shift lever to N position and start the engine again.

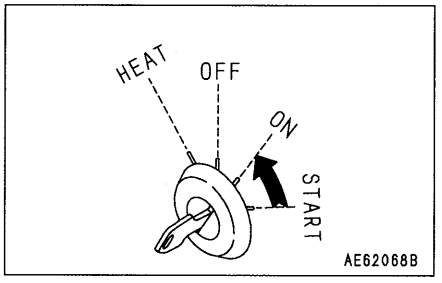
1. Depress accelerator pedal ① lightly.



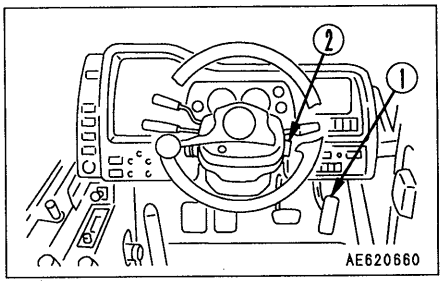
2. Insert the key in starting switch ②, turn to the START position and start the engine.



3. After starting, release the key in starting switch ②. The key will return automatically to the ON position.



12.2.2 STARTING IN COLD WEATHER



⚠ WARNING

- **Check that there are no people or obstructions in the surrounding area, then sound the horn before starting the engine.**
- **If any starting aid fluid is used for starting, there is danger of an explosion, so never use such starting aids.**

NOTICE

Do not crank the starting motor continuously for more than 20 seconds.
If the engine does not start, wait for about 2 minutes before trying to start again.

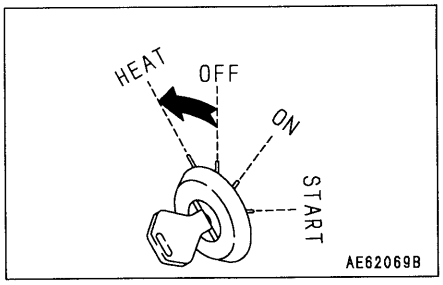
REMARK

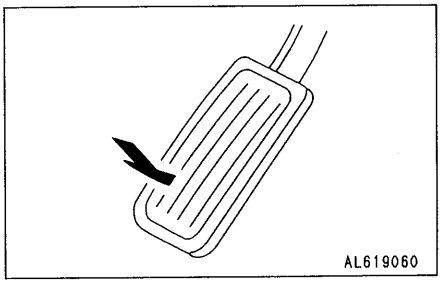
If the gear shift lever is not at the N position, the engine will not start.

If the ambient temperature is low, do as follows.

1. Turn the key in starting switch ② to the HEAT position and carry out preheating in accordance with the table below.

Ambient temperature	Preheating time
0°C and above	–
0°C to –10°C	20 sec.
–10°C to –20°C	30 sec.



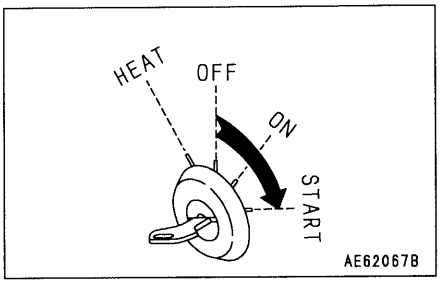


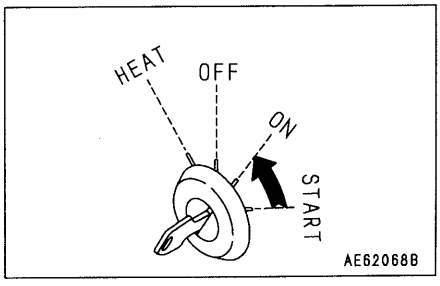
It will be difficult to start the engine if the preheating time is either too long or too short, so always keep to the preheating times in the table above.

2. Depress accelerator pedal ① lightly.

3. Insert the key in starting switch ②, turn to the START position and start the engine.

4. After starting, release the key in starting switch ②. The key will return automatically to the ON position.



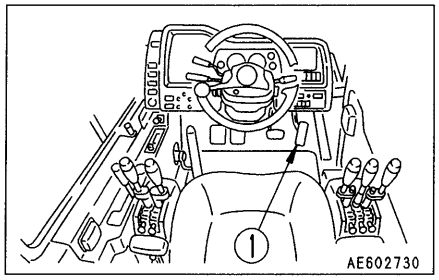


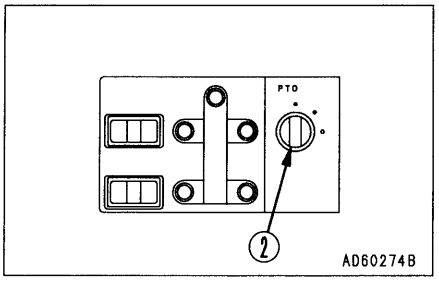
12.3 OPERATION, CHECK AFTER STARTING ENGINE

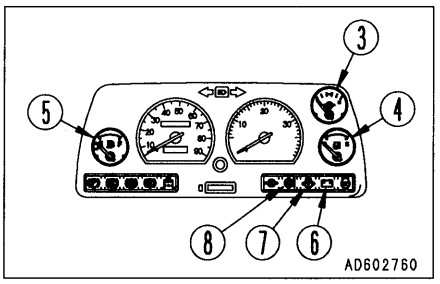
After starting the engine, do not start operations immediately. Carry out the following operations and checks first.

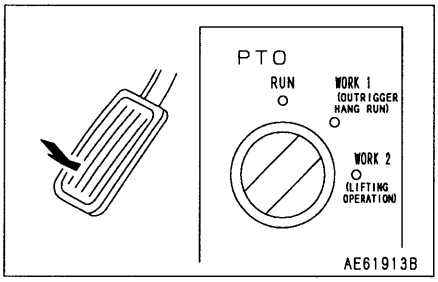
⚠ WARNING

If any errors are displayed on the MOMENT LIMITER (OVER-LOAD PREVENTIVE SYSTEM) panel, immediately stop working or traveling, and follow the descriptions in the manual. Especially, the contents is marked ⚠, it may cause the serious accidents.









NOTICE

Do not accelerate the engine suddenly before completing the warming-up operation.
Do not run the engine at low idling or high idling continuously for more than 20 minutes.
If it is necessary to continue to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.

1. Depress accelerator pedal ① lightly, run the engine at a mid-range speed, then run it for approx. 5 minutes at low idling. When starting in cold weather, set PTO switch ② to the "WORK 1" or "WORK 2" position, and carry out the warming-up operation at a mid-range speed of the engine.

2. After the warming-up operation, check that the following items on the machine monitor are normal. If any abnormality is found, carry out maintenance or repair.
   - Air pressure gauge ③: Is it in red mark – 1.0 MPa (10 kgf/cm²) range?
   - Engine water temperature gauge ④: Is it in white range?
   - Fuel gauge ⑤: Is it in white range?
   - Battery charge caution lamp ⑥: Is it OFF?
   - Engine oil pressure caution lamp ⑦: Is it OFF?
   - Torque converter overheat caution lamp ⑧: Is it OFF?

3. Check for any abnormal exhaust gas color, sound, or vibration. Also check that the caution buzzer is not sounded. If any abnormality is found, repair it.

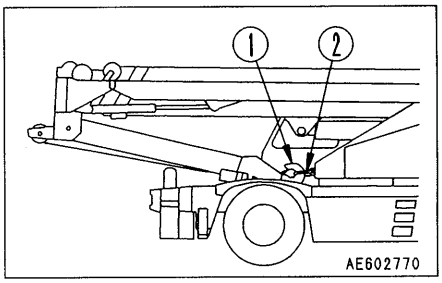
12.4 PREPARATIONS BEFORE MOVING MACHINE OFF (WHEN TRAVELING ON PUBLIC ROADS)

⚠ WARNING

- **Before operating the gear shift lever, check the direction that the upper structure is facing.**
- **Check that there is no one near the machine.**

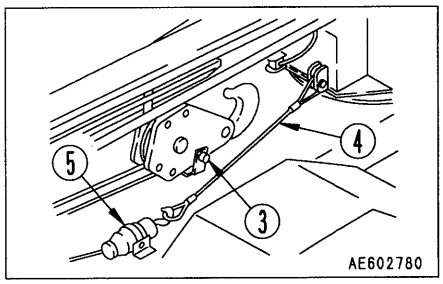
12.4.1 TRAVEL POSTURE

When traveling on roads, use the following procedure to set the machine to the travel posture.



1. Extend the outriggers, raise the boom, and move main hook ① and auxiliary hook ② to above the stowing position.

2. Insert hook ①, ② in the stowing position, fit lock ring and wire for auxiliary winch ④, then operate the main winch and auxiliary winch while lowering the boom to a horizontal position, and lay hook ① and ② on top of the frame.

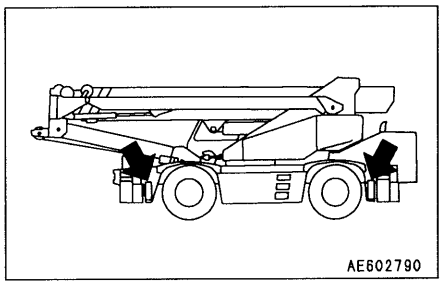


REMARK

When the boom is lowered to a position near horizontal, the overwind alarm buzzer will sound, so set the MOMENT LIMITER (OVERLOAD PREVENTIVE SYSTEM) automatic stop switch to the CANCEL position and continue the operation.

3. Insert lock pin ③, then insert the I inch pin. Lock auxiliary hook with band ⑤.

4. Wind in the wire rope to remove the slack, but be careful not to overwind.



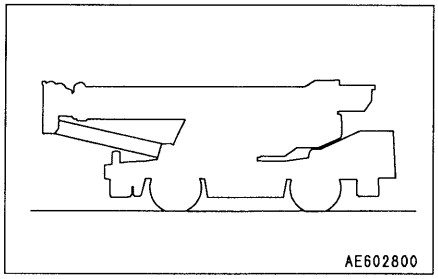
5. Stow away from the outriggers.

6. Set the PTO switch to the RUN position.
   For details of the method of removing the main hook from the travel posture, see "12.26 PRECAUTIONS FOR OPERATION".

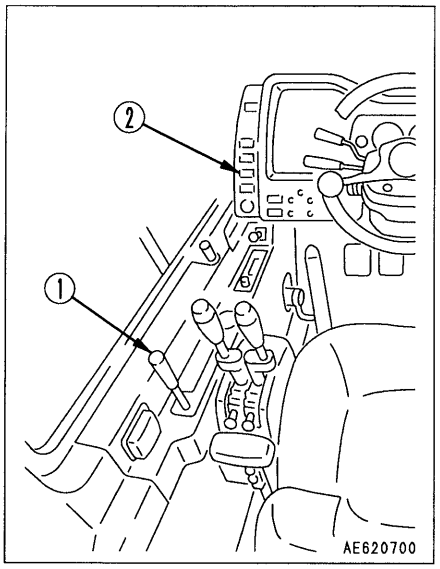
7. Check that the wooden blocks are securely stowed away.

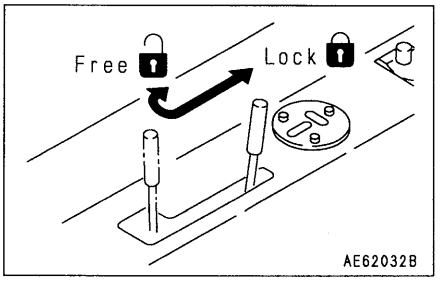
12.4.2 PREPARATIONS BEFORE TRAVELING

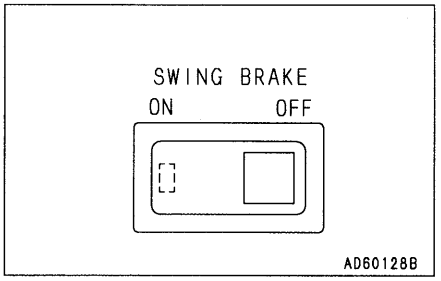
After setting the machine to the travel posture, carry out the following preparations before traveling on the road.



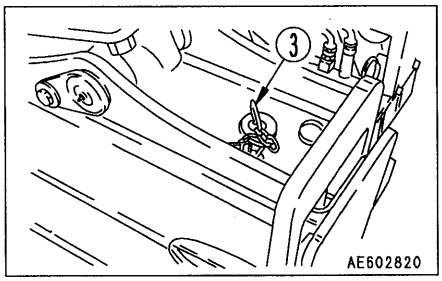
1. Set swing lock lever ① to the LOCK position, and set swing break switch ② to the ON position.
   At the same time, the lamp inside the switch lights up.

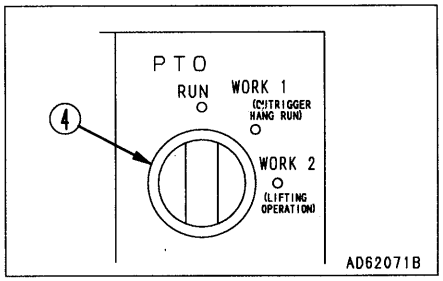


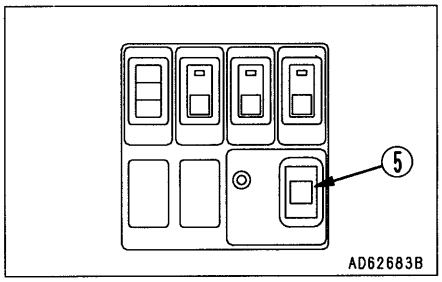


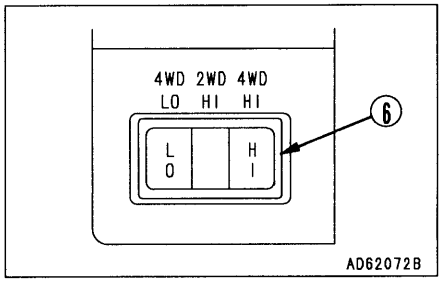


2. Operate each switch and lever to check that they are in the following condition or position.
   - For the rear steering lock, does the LOCK light up at the pilot lamp?
   - Are the outriggers retracted fully and is stopper pin ③ inserted?
   - Are all the control levers at the neutral position?
   - Is PTO switch ④ at the RUN position?
   - Is travel mode switch ⑥ at "2WD HI" position?
   - Is suspension switch ⑤ at the FREE position?
   - Are the main and auxiliary winch levers locked?
   - Are the main and auxiliary clutch levers at the ON position?
   - Are the main and auxiliary drum lock levers at the LOCK position?
   - Is the tire inflation pressure 0.9 MPa (9.0 kgf/cm^2)?
   - Are there any loose wheel bolts?
     When using a new machine, travel for 20 to 40 km, then stop and tighten all parts.









12.5 MOVING MACHINE OFF

⚠ WARNING

- **When moving the machine off, check that the area around the machine is safe, then sound the horn before starting.**
- **Do not allow people near the machine.**
- **There is a blind spot behind the machine, so be particularly careful when traveling in reverse.**
- **If the air pressure drop monitor is lighted up and the alarm buzzer sounds, the machine must not be started. Raise the engine speed and wait for the buzzer to stop.**

12.5.1 NORMAL STARTING

1. Check that there is no warning display on the following caution lamps on the front panel.
   - Engine oil pressure caution lamp ①: Is it OFF?
   - Battery charge caution lamp ②: Is it OFF?
   - Torque converter overheat caution lamp ③: Is it OFF?
   - Brake oil level caution lamp ④: Is it OFF?
   - Air pressure drop caution lamp ⑤: Is it OFF?

   If any of the above caution lamps lights up, the alarm buzzer will sound.

2. Set steering mode switch to "front 2-wheel".

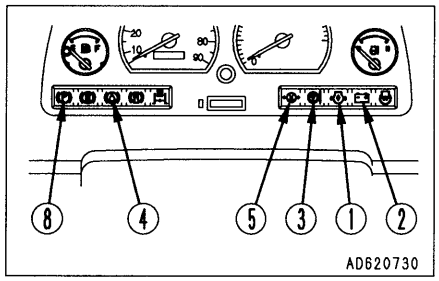
3. Set travel mode switch ⑥ to the 2WD Hi position.

4. Turn parking brake switch ⑦ OFF, and check that the parking brake indicator lamp ⑧ goes out.

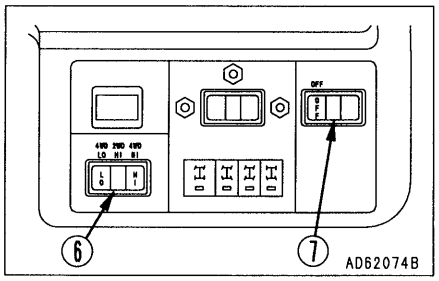
REMARK

If the parking brake is not released and the gear shift lever is at any position other than N, the central warning lamp will flash and the alarm buzzer will sound.

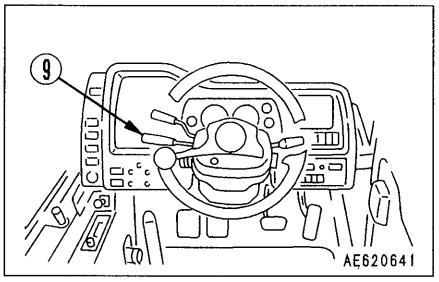
5. Operate gear shift lever ⑨, depress the accelerator pedal, and start the machine.



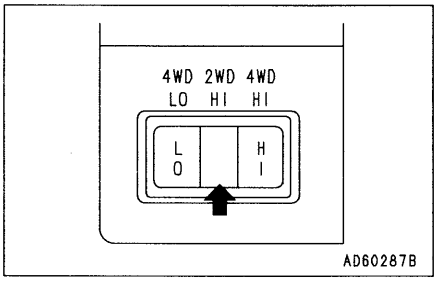
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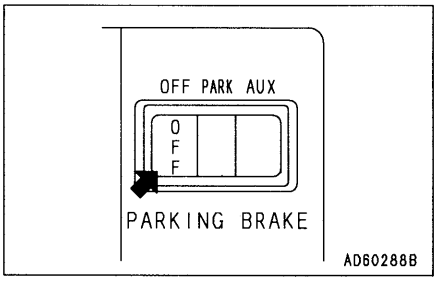
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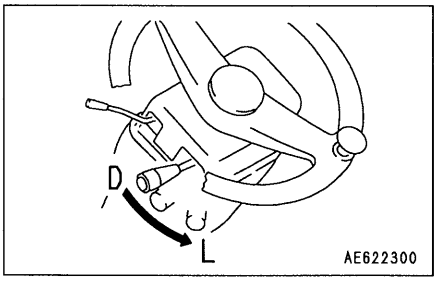
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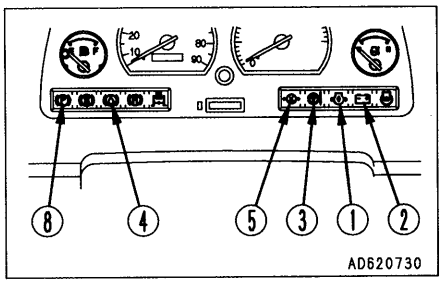
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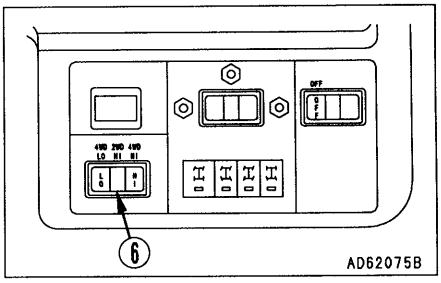
12.5.2 STARTING ON SLOPES

When starting on a slope, check the machine monitor, then do as follows.

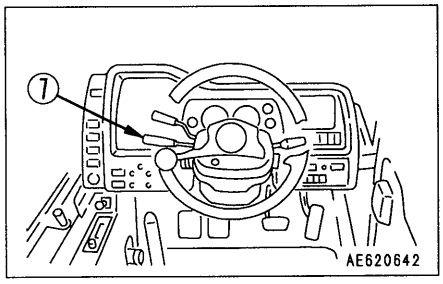


1. Check that there is no warning display on the following caution lamps on the front panel.
   - Engine oil pressure caution lamp ①: Is it OFF?
   - Battery charge caution lamp ②: Is it OFF?
   - Torque converter overheat caution lamp ③: Is it OFF?
   - Brake oil level caution lamp ④: Is it OFF?
   - Air pressure drop caution lamp ⑤: Is it OFF?

   If any of the above caution lamps lights up, the alarm buzzer will sound.

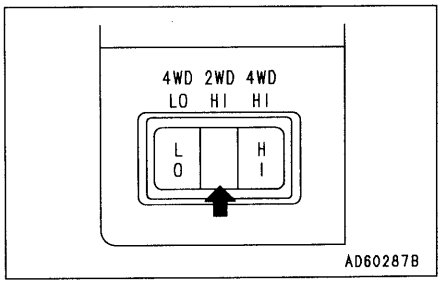


2. Set travel mode switch ⑥ to "2WD Hi".
   When setting gear shift lever ⑦ to the positions except the "N" (neutral) without releasing the parking brake, the alarm buzzer will sound.



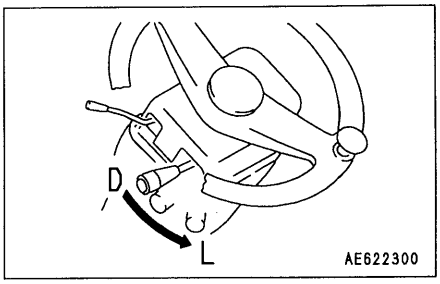
3. Depress the brake pedal, then release the parking brake.
   Check that the parking brake indicator lamp ⑧ goes out.

4. Set gear shift lever ⑦ to the D, 2 or L position, depress the accelerator pedal to raise the engine speed, and release the brake pedal slowly to allow the machine to start moving.



NOTICE

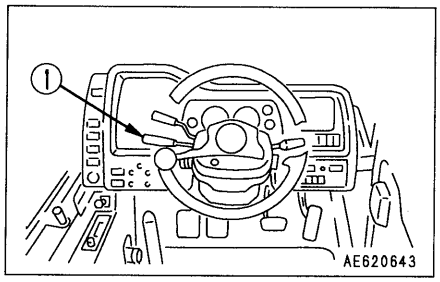
- **When starting on a slope, rise the engine rotation fully so as not to move backward, then release the foot brake.**
- **Do not use the traveling mode 4WD on the road other than the snow-covered road, the slippery road surface such as the soft ground and the steep slope.**
- **If the traveling mode 4WD is used on the public road, the abnormal wear of the tires and the load to the machine are increased.**
- **Travel on the public road at "2WD Hi".**



REMARK

- If it is impossible to start at the "2WD Hi" position, set the traveling mode selector switch ⑥ to "4WD LOW", shift the gear shift lever ⑦ to the "L" position, then start the machine.
- When switching from 2WD to 4WD, depress the brake pedal to stop the machine and return the gear shift lever to N(neutral) position, then shift the lever.
- If the gear shift lever is not returned to N, it is impossible to shift to 4WD although the switch is on.

12.6 SHIFTING GEARS



This machine has an automatic transmission, so if gear shift lever ① is at the D position, the gears will shift automatically to match the travel speed.

REMARK

If the travel mode switch is at the "2WD Hi" or "4WD Hi", the transmission will shift automatically to direct drive above a certain speed to improve the efficiency of the drive.
Always stop the machine completely before shifting between forward and reverse.

SHIFTING DOWN

When shifting down, always shift down one stage at a time (D → 2, 2 → L). Do not shift down two stages at once.

REMARK

- Even if the gear is shifted down, the transmission will not shift down until the set speed is reached.
- When traveling downhill and shifting down to reduce speed, use the exhaust brake, foot brake, and braking force of the engine to reduce the engine speed to less than 1250 rpm before shifting gears.
  Gear shift lever position and permissible travel speed is shown below.

Gear shift

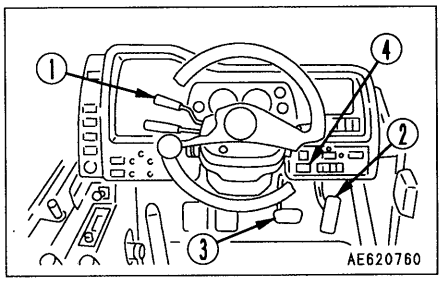
Lever position	Gear shift lever position and permissible travel speed	
	Hi	LOW (4-wheel drive, LO)
L	Max. 23 km/h (14 MPH)	Max. 9 km/h (6 MPH)
2	Max. 41 km/h (25 MPH)	Max. 17 km/h (11 MPH)
D	Max. 49 km/h (30 MPH)	Max. 26 km/h (16 MPH)
R	Max. 30 km/h (19 MPH)	Max. 12 km/h (7 MPH)

Do not travel at above the permissible speed for any gear shift lever position.
If the permissible speed is exceeded, the overrun warning buzzer (PICO-PICO sound) inside the top panel will sound.

NOTICE

Do not raise the engine rotation over 2700 rpm. The engine can be damaged.

12.7 TRAVELING DOWNHILL

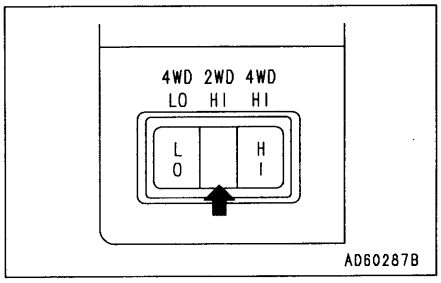


⚠ WARNING

- **If the foot brake is used frequently, there is danger that the brakes will overheat and cause damage to the brake system or other parts.**
- **When the retarder (option) is equipped, take care for the following items.**
  1) **When using the retarder on the wet ground or slippery surfaces, it is very dangerous, because the retarder actuates to the front wheels.**
  2) **Do not use the retarder on frozen ground.**
  3) **Do not use the retarder as the parking brake.**
  4) **To prevent from overheating, when the retarder temperature rises abnormally, the system which braking force is automatically reduced, is actuated. (At this time, the retarder indicator lamp flashes.)**
     When this happens, operate the retarder carefully, and prepare to depress the foot brake at any time.

1. When traveling downhill, turn exhaust brake switch ① on (the exhaust brake indicator lamp lights up), release accelerator pedal ②, and use the braking force of the engine.
   Keep the engine speed to within the permitted speed of 2700 rpm.

   When using the braking force of the engine, set travel mode switch ④ to the "2WD Hi" position.



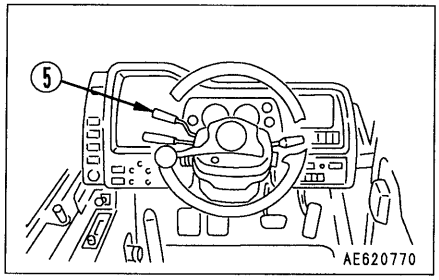
2. If the travel speed still increases, reduce the speed with foot brake ③, then shift down (D → 2, 2 → L) to make the load on the foot brake as small as possible.

NOTICE

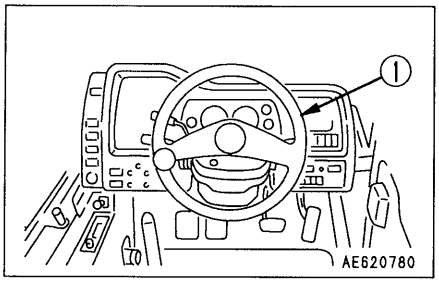
When shifting down, if the travel speed exceeds the permissible speed for any gear shift lever position, the overrun prevention function will be actuated and the gear will not shift down. If this happens, use the foot brake to reduce the travel speed.

REMARK

- If accelerator pedal ② is depressed, the exhaust brake is canceled.
- For the retarder (option) mounted machine, if the accelerator pedal ② is released when the retarder switch ⑤ is at "ON" (the retarder indicator lamp lights up), the retarder and the exhaust brake are activated and the brake is applied. If the accelerator pedal ② are depressed, the retarder and the exhaust brake is canceled.



12.8 STEERING MACHINE



⚠ WARNING

- **Turning the machine on slopes may cause the machine to slip to the side, so avoid turning on slopes as far as possible. Be particularly careful on soft or clay ground.**
- **It is dangerous to travel down steep slopes or turn suddenly when traveling at high speed.**
- **If the engine stops when the machine is traveling, it will be impossible to operate the steering, so never stop the engine.**

12.8.1 NORMAL STEERING

When traveling, turn steering wheel ① in the direction that the machine is to turn.

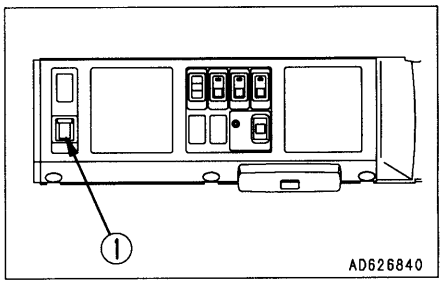
NOTICE

In cold weather, if the steering becomes heavy, turn the PTO switch to the "WORK 1" or "WORK 2" position and carry out warming-up operations thoroughly.

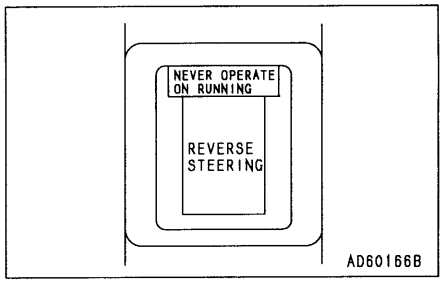
12.8.2 REVERSE STEERING COMPENSATION MECHANISM

⚠ WARNING

When operating reverse steering, do as follows.
- **Do not operate reverse steering on public roads.**
- **When the upper structure is turned to the rear, the reverse steering traveling can be operated.**
- **Stop machine before switching between reverse steering and normal steering. Switching them during traveling causes serious injury or death because of changing steering feeling.**
- **During reverse steering, set the swing brake switch to ON and do not swing. If the upper structure is not in the rear position by swinging, it returns to normal steering.**
- **Even when the reverse steering is being operated, the FORWARD/REVERSE direction selection, and the operation of the backup buzzer and turn signal indicator lamps are not compensated.**
  Especially when turning to the left while reversing, take care for the surroundings.

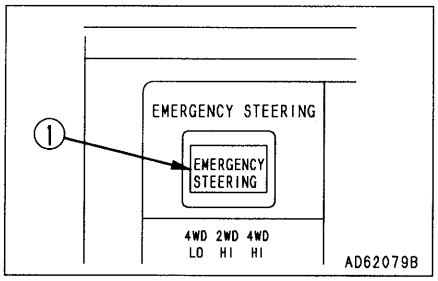


1. Swing the upper structure to face the rear.
2. Press reverse steering switch ① (to set to "ON") at the top panel rear portion in the cab.
3. When the machine is set to the reverse status, the reverse steering switch lights up (red).



NOTICE
- **When the upper structure is not turned to face the rear within approx. 10°, the reverse steering is not operated, the reverse steering switch flashes and the buzzer sounds.**
- **When flashing, the machine status does not match with the switch.**
  Again press the reverse steering switch, and make the switch light up or go out.
- **When operating the reverse steering, the interlock due to the machine speed cannot be actuated.**
- **When operating the reverse steering, rear wheels (regularly front wheels) are steered in the two wheel-front mode.**
- **When turning the upper structure to the direction except the rear, always press the reverse steering switch, and cancel the reverse steering.**

12.8.3 EMERGENCY STEERING



⚠ WARNING

The emergency steering system must not be used continuously for more than 5 minutes. This system is only used in emergencies, so always check the system when carrying out periodic maintenance (EVERY 250 HOURS).

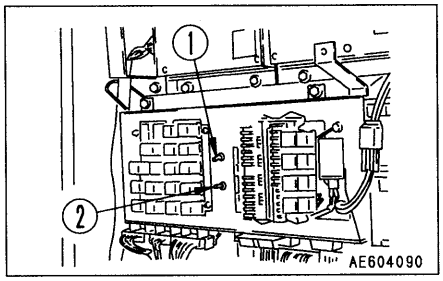
1. When emergency steering switch ① is pressed, the pilot lamp (red) inside switch will light up, and the steering can be operated.

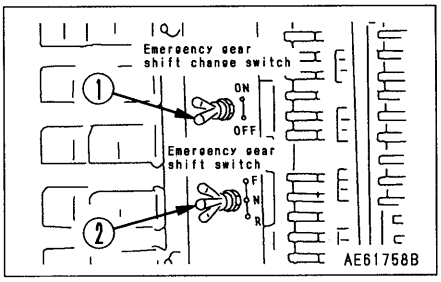
2. After stopping the machine, press the switch again immediately and check that the pilot lamp has gone out.

NOTICE

- **Use this system only when the steering pump has broken down and the normal steering operation cannot be carried out.**
- **Always set the switch to "OFF" when operating the normal steering.**
- **If the machine does not travel even when the engine stops or the steering pump is damaged, the switch should be "OFF".**

12.8.4 EMERGENCY GEAR SHIFT TRAVELING





⚠ WARNING

Because the emergency gear shift system is used only in emergency, carry out the periodic service (every 250 hours service).

1. EMERGENCY GEAR SHIFT CHANGE SWITCH

When there are abnormalities in the gear shift lever, transmission gear shift controller, etc., and the machine cannot travel normally, set this switch to ON, and then operate gear shift switch ②.

REMARK

If the emergency gear shift switch is set to ON, after repairing the trouble, immediately set the switch to OFF.

2. EMERGENCY GEAR SHIFT SWITCH

After emergency gear shift change switch ① is set to ON, when this switch is set to F or R, the machine can travel.

In this case, the gear speed is 2nd by the torque converter.

NOTICE

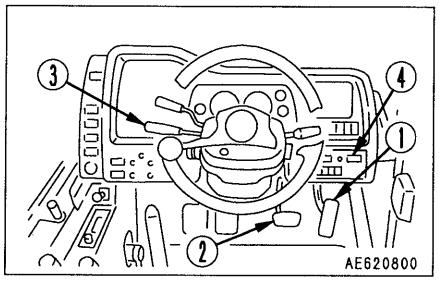
Use this system when there are abnormalities in the gear shift lever, transmission gear shift controller, etc., and the machine cannot travel normally.

When the machine is not traveling (normal, abnormal), turn this switch to "OFF", and make sure it stays in this position.

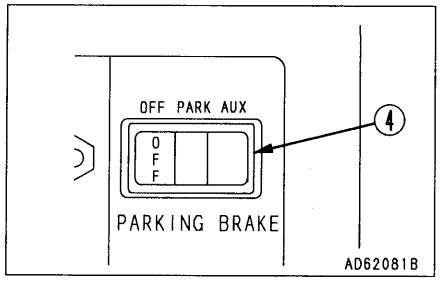
12.9 STOPPING MACHINE

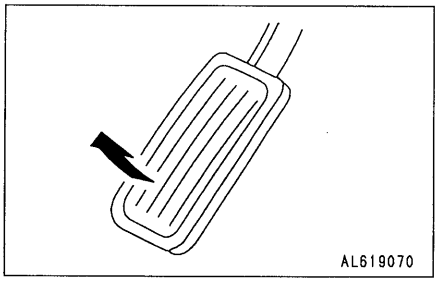
⚠ WARNING

- **Do not stop the machine suddenly except in emergencies. Use the braking force of the engine to slow down the machine before applying the foot brake, and leave room to spare when stopping.**
- **Do not park the machine on slopes.**
  If the machine must be parked on a slope, block the wheels to prevent the machine from moving.
- **If the control levers are touched by accident, the machine may move suddenly.**
  When standing up from the operator's seat, tip the right control levers to the rear and place the lock pin of the winch clutch lever in the LOCK position.

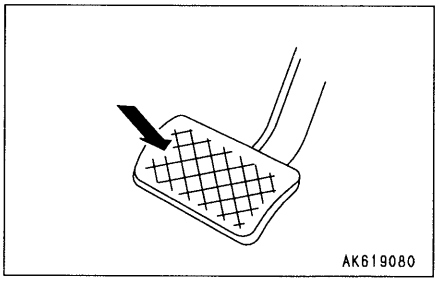


1. Release accelerator pedal ① and use the braking force of the engine to reduce the travel speed.

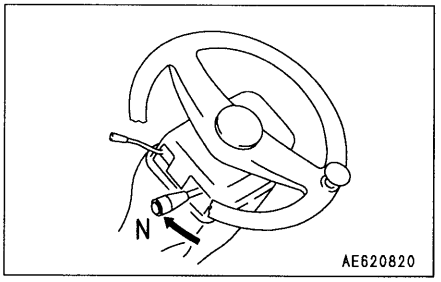




2. Depress brake pedal ② to apply the brake and stop the machine.



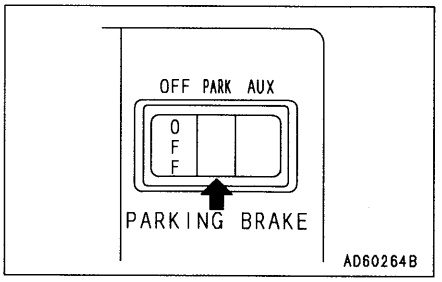
3. Move gear shift lever ③ to the N position.



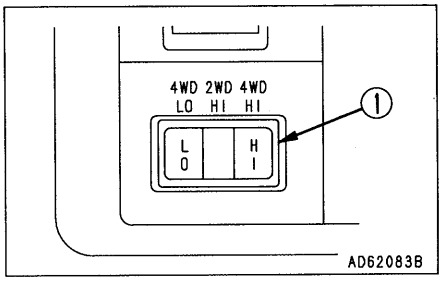
4. Set parking brake switch ④ to the PARK position.
   At this time, the "PARK" indicator lamp inside the combination meter lights up.

REMARK

Except in emergencies, the parking brake must be used only when the machine has completely stopped.



12.10 TRAVELING ON ROUGH GROUND



When traveling on slopes of more than 10%, or when traveling on rough or soft ground, first stop the machine and place drive switch ① to "4WD LOW" (the lamp inside the switch lights up), then drive the machine.

NOTICE

- **If the machine gets stuck on rough or soft ground, and the wheels start to spin, switch immediately to 4-wheel drive. Do not allow the wheels to spin continuously for a long time.**
- **Always stop the machine and set the gear shift lever to the N position before switching the travel mode.**

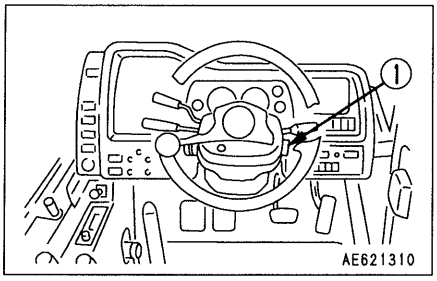
REMARK

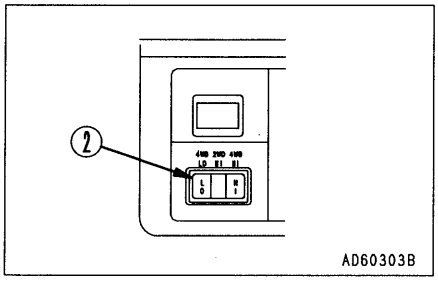
This machine cannot be driven on soft ground where the tires sink 10 cm (3.9 in) into the ground, so do not enter such areas.

12.11 SWITCHING 4-WHEEL DRIVE, HI-LOW

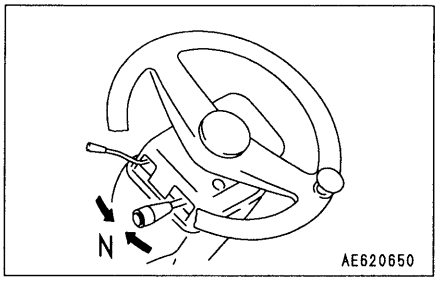
⚠ WARNING

To carry out the operation when switching between 4WD Hi and 4WD LOW smoothly and securely, do as follows.



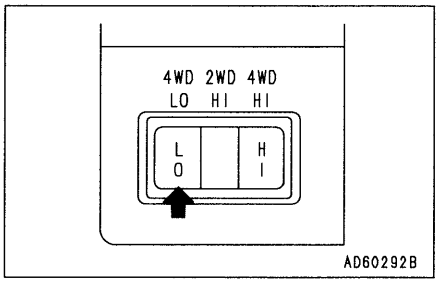


1. Stop the machine completely and set gear shift lever ① to the N position.



2. Set the traveling mode switch ② to 4WD LOW.
   At this time, make sure that the lamp inside the switch lights up.

3. Set gear shift lever ① in the position, then start the machine.



NOTICE

- **Never press the traveling mode switch when traveling.**
- **When the gear shift lever is set at other than the N position, or the machine is not stopped, if the switching operations at 4WD LOW–2WD Hi–4WD Hi is attempted, the switching operations is not carried out and the alarm buzzer (PICO-PICO sound) sounds.**

12.12 SPECIAL TRAVEL

⚠ WARNING

Always obey the following rules when using special steering.

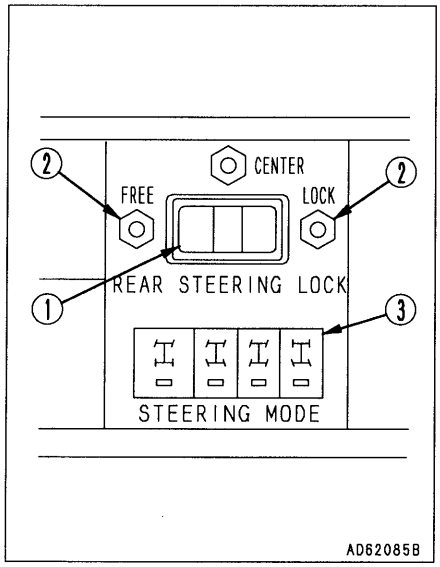
- **Special travel must not be used when traveling on public roads.**
- **Using 4-wheel steering when traveling at high speed is dangerous because it has the same effect as operating the steering wheel suddenly.**
- **Do not pull out the rear steering lock pin when traveling on the public road.**
- **Always stop the machine before the switching operation of the rear steering lock pin and the special steering. If this is done during traveling, the steering feeling changes and it may cause the serious injury or accident.**
- **When the rear steering lock, center, cancel indicators or the steering mode indicator lamp are flashing, any abnormalities are occurred. Stop the machine and follow the instructions of the manual.**
- **The maximum speed on special traveling is limited to 20 km/h. (12 MPH)**

NOTICE

- **The operating of the special steering can be done only when the rear steering lock pin is released. Check the rear steering cancel indicator lamp before operating the special steering.**
- **For switching to the 4-wheel steering, crab steering and rear 2-wheel steering, ensure that they are switched before starting traveling, because the interlock is applied according to the speed and the switching can be done only when the speed is under 10 km/h (6 MPH), and start the traveling. Always cancel the rear steering lock before using 4-wheel crab steering.**
- **When switching to 2-wheel steering, the interlock is not applied according to the speed. Do not operate it when traveling.**
- **If the steering switching is not done even when pressing the steering mode switch, the steering mode indicator lamp lights up to show the machine condition, and the pressed steering mode indicator lamp flashes.**
  Press the steering mode switch that the indicator lamp is flashing once, and then operate the steering mode switching again.

12.12.1 STEERING MODES

1. When the rear steering lock cancel switch ① is set to "CANCEL", the rear steering lock pin is unlocked.



REMARK

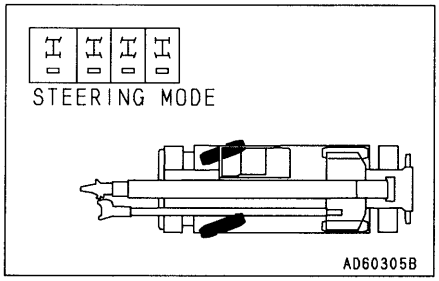
- Canceling and locking of the rear steering lock pin is possible only when the front 2-wheel steering is operated.
- When canceling and locking of the rear steering lock pin is impossible, the indicator lamp ② flashes.
- For canceling and locking of the rear steering lock pin, the intelock is not applied according to the speed. Do not operate it when traveling.

2. After canceling the rear steering lock pin, "4-wheel steering","crab steering" or "rear 2-wheel steering" can be selected from the front 2-wheel steering condition by operating the steering mode switch ③.

SWITCH POSITION AND STEERING

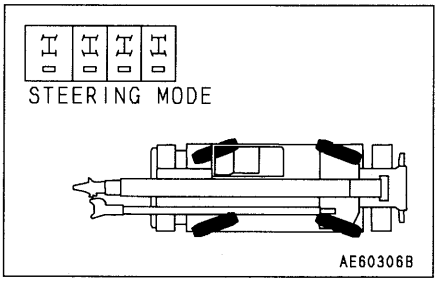
1) (front 2-wheel) position

- When the steering mode switch is pressed, the lamp inside the switch lights up (green).
- Apply the rear steering lock before rear steering.
  Check that the LOCK lamp (orange) of the rear steering lock indicator lights up at the same time.



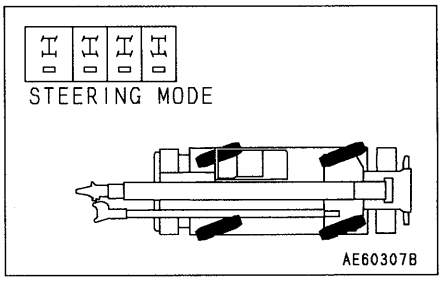
2) (4-wheel) position

- When the steering mode switch is pressed, the lamp inside the switch lights up (orange).
  When the switch is set to this position, the rear wheels turn in the opposite direction from the front wheels.
- Cancel the rear steering lock before rear steering.
  Check that the FREE lamp (red) of the rear steering lock indicator lights up at the same time.



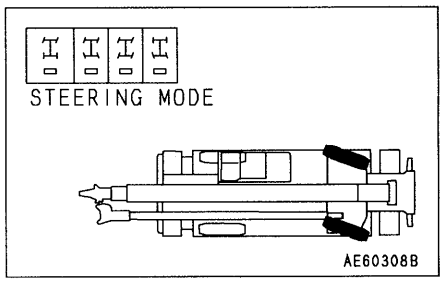
3) (crab) position

- When the switch is set to this position, the lamp inside the switch (orange) lights up. The rear wheels turn in the same direction as the front wheels.
- Cancel the rear steering lock.
  Check that the FREE lamp (red) of the rear steering lock indicator lights up at the same time.



4) (rear 2-wheel) position

- When the switch is set to this position, the lamp inside the switch (orange) lights up. Only the rear wheels turn.
- Cancel the rear steering lock.
  Check that the FREE lamp (red) of the rear steering lock indicator lights up at the same time.

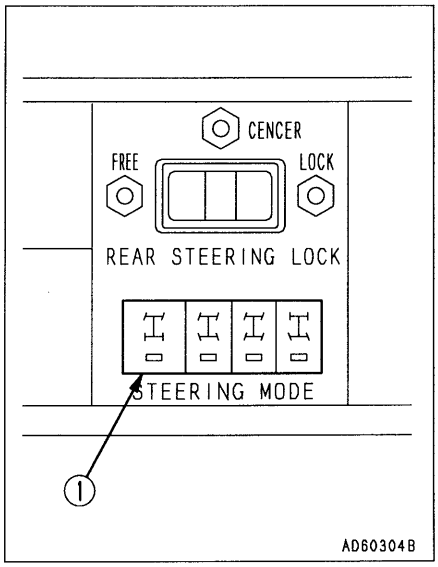


The relationship between the position of the switch, actuation of the rear steering lock, and movement of the rear wheels is as follows.

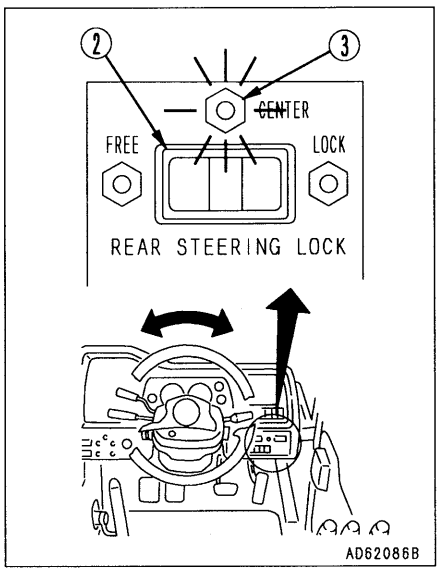
Switch position	Rear steering lock	Direction of rear wheels lock
Front 2-wheel	Lock is applied	–
4-wheel	Lock is canceled (made free)	Turn in opposite direction from front wheels
Crab	Lock is canceled (made free)	Turn in same direction as front wheels
Rear 2-wheel	Lock is canceled (made free)	Only rear wheels turn

12.12.2 METHOD OF APPLYING REAR STEERING LOCK

1. Set steering mode switch ① to the front 2-wheel position (the lamp (red) inside the switch lights up).



2. Keep rear steering lock switch ② pressed and turn the steering wheel slowly to the left and right. The CENTER (orange) lamp of rear steering lock indicator lamp ③ will light up and the rear steering lock will be applied. When it is locked, the LOCK lamp lights up.



NOTICE

- **Do not turn the steering wheel suddenly.**
  When the LOCK lamp is lighted up, do not press the rear steering lock switch while operating the steering wheel.
- **The intelock is not applied according to the speed. Never operate it when traveling.**

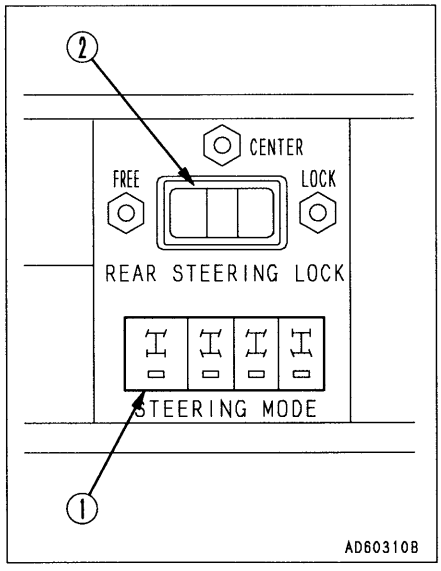
12.12.3 METHOD OF CANCELING REAR STEERING LOCK

1. Make sure that the steering mode switch ① is set to the front 2-wheel position.

2. Press the rear steering lock cancel switch ②, and check that the FREE lamp (red) lights up.

3. If it does not light up, keep the rear steering lock cancel switch pressed and turn the steering wheel slowly to the left and right.

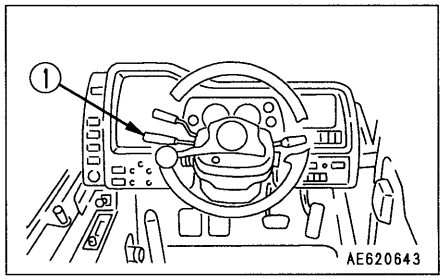
When the FREE lamp lights up, the cancel operation is completed.



NOTICE

- **Do not turn the steering wheel suddenly.**
- **The intelock is not applied according to the speed. Never operate it when traveling.**

12.13 SWITCHING BETWEEN FORWARD AND REVERSE

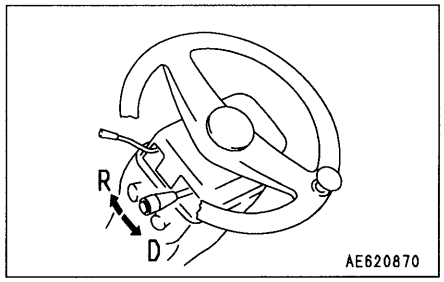


⚠ WARNING

- **Stop the machine and check that the direction of travel is safe.**
- **There is a blind spot behind the machine, so be particularly careful when changing from forward to reverse.**

1. Stop the machine. For details, see "12.9 STOPPING MACHINE".

2. Set gear shift lever ① to the desired position (D or R).



12.14 PRECAUTIONS WHEN TRAVELING

12.14.1 PRECAUTIONS WHEN GOING UP OR DOWN HILLS

⚠ WARNING

- **Never place the gear shift lever at the N position when traveling downhill. It is dangerous to travel downhill without using the braking force of the engine. It will also lead to damage to the transmission and other parts of the power train.**
  Always place the gear shift lever in a travel position when traveling downhill.
- **When traveling downhill, use the exhaust brake and braking force of the engine to reduce the travel speed to a speed that matches the slope. On steep slopes where the travel speed increases, shift down to the 2 or L range to reduce the load on the foot brake as much as possible.**
  If the foot brake is used frequently, there is danger that the brakes will overheat and cause damage to the brake system or other parts.
- **If there is a burning smell from the brake pad or white smoke is given off, stop the machine immediately and rest the machine for some time.**
  While the machine is stopped, apply the parking brake and leave the foot brake free.
- **The braking force of the engine is reduced when 4-wheel LOW is used, so do not travel downhill.**

12.14.2 WHEN ENGINE STOPS

If the engine stops on a slope, immediately depress the foot brake pedal fully, stop the machine, and set the parking brake switch to the PARK position. Then move the gear shift lever to the N position and start the engine again.

12.14.3 WHEN BRAKES DO NOT WORK

- There are two brake systems, so even if there is a failure in one of the brake lines, the brakes will still work. However, the braking capacity will be reduced. In such cases, travel at a low speed.

- If the brake should fail while the machine is traveling and it is necessary to make an emergency stop, use the parking brake to stop the machine.
  The parking brake must not be used for stopping the machine during normal travel operations.

12.14.4 PRECAUTIONS WHEN TRAVELING ON ROADS

⚠ WARNING

- **The values specified in "The safety standard for on-road carrying vahicles" have been relaxed for this machine. Carefully operate this machine.**
- **A passage permit is needed when traveling as provide by the vehicle restriction law. Obey the passage conditions on the permit and travel.**
- **If the machine breaks down and it is necessary to park in a non-parking area, turn on the hazard switch to indicate that the machine has made an emergency stop.**
- **Never travel on roads with the working lamp or step lamp**

NOTICE

When traveling on public roads or when traveling at high speed, always set the steering mode switch to the front 2-wheel position and check that the rear steering lock is at the LOCK position before starting.

When switching from 4-wheel steering to 2 wheel steering, see "12.12 SPECIAL TRAVEL".

12.14.5 PRECAUTIONS WHEN TOWING

⚠ WARNING

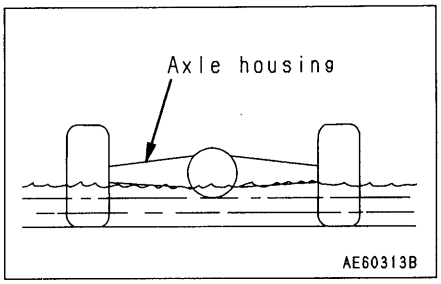
The hook at the front of the machine is a simple hook, so use it for light loads, such as towing on flat ground.

If the machine must be towed on rough ground, use the towing hook at the back of the machine.

12.14.6 PERMISSIBLE WATER DEPTH

When operating in water and swamp, always keep the bottom of the axle housing above the surface of the water.

After operation, clean the machine and grease the portions exposed to water.

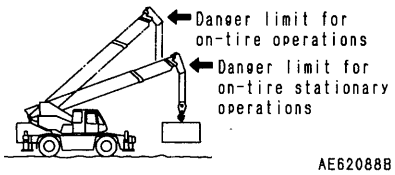


12.15 PRECAUTIONS BEFORE CRANE OPERATIONS

⚠ WARNING

Set the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) correctly to match the crane operation.

- **The MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) calculates the moment in accordance with the switch setting. If the setting is different from the actual operation, the following problems will appear, so be extremely careful when setting the switches.**
  Example: Setting of switch
  Lifting travel On-tire stationary position
  If the above setting is used, the moment will be calculated for the condition when the outriggers are fully extended, so no warning or alarm will be given when the equipment approaches the danger zone.
  As a result, if the machine enters the danger zone, the machine may suddenly turn over without warning.



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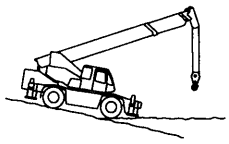
If the machine exceeds the danger zone, it will turn over without alarm.

- **The outrigger extending width is detected by the length sensor, but always carry out the visual check that the actual machine condition is different from the display of MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) when the outrigger is extended.**

⚠ WARNING

Operate the machine only on horizontal ground.

- **The MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) calculates the moment assuming that the machine is horizontal.**
  If the machine is not horizontal and operations are carried out, no warning or alarm will be given even when the machine approaches the danger zone. In addition, an excessive moment will act on the machine and this will cause damage or breakage of the work equipment.


AE603150

12.16 OUTLINE OF CRANE OPERATIONS

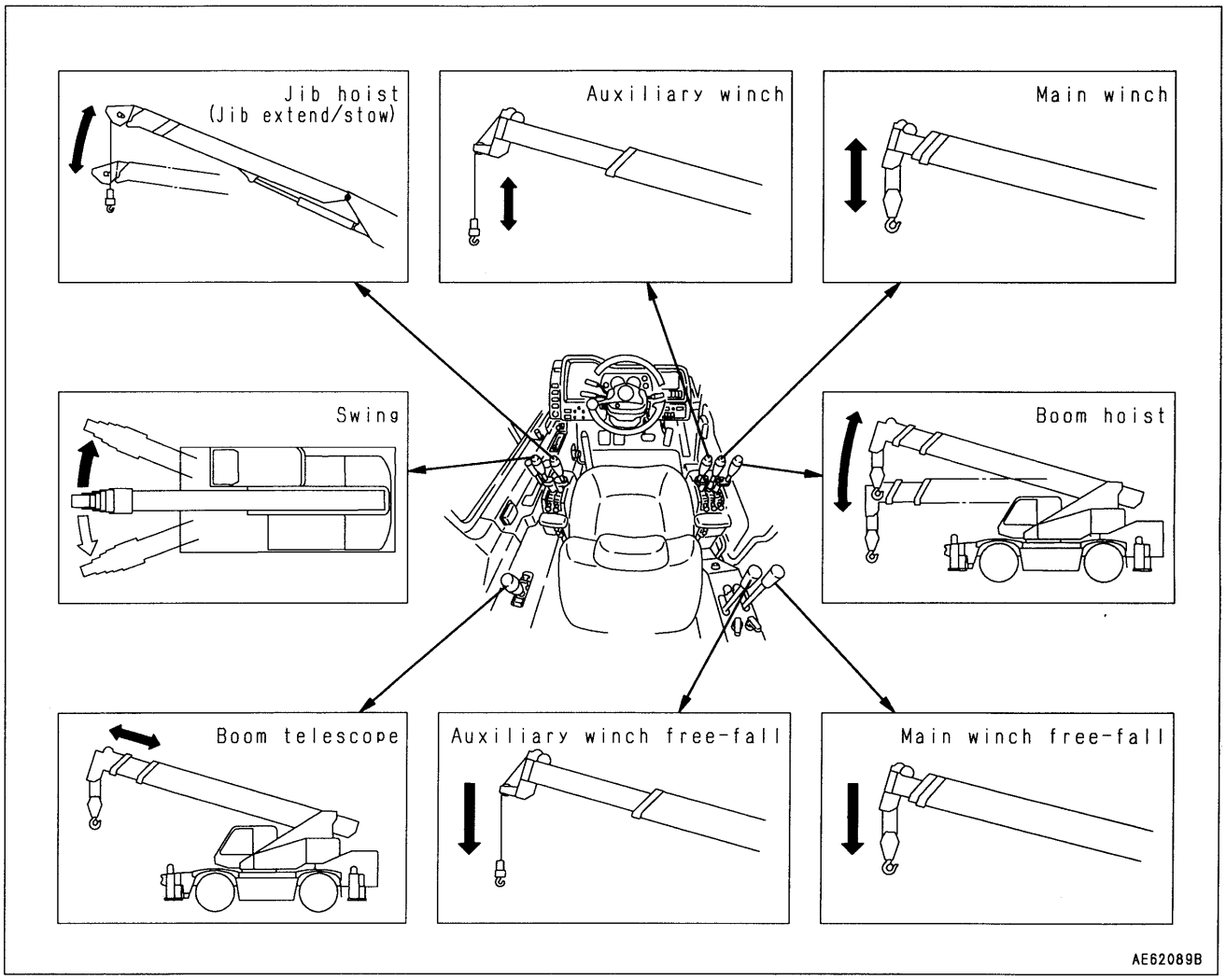
This section gives an explanation of crane operations.

The relationship between the control levers and the work equipment is shown in the diagram below. For details, see the explanation on the following pages.

Order

- Outrigger operations: 2-110
- Main winch operations: 2-122
- Auxiliary winch operations: 2-127
- Boom operations: 2-132
- Swing operations: 2-136
- Precautions for operation: 2-139

For details of the method of stowing the hook, see "12.4.1 TRAVEL POSTURE".



12.17 OUTRIGGER OPERATIONS

12.17.1 METHOD FOR OUTRIGGER OPERATIONS

⚠ WARNING

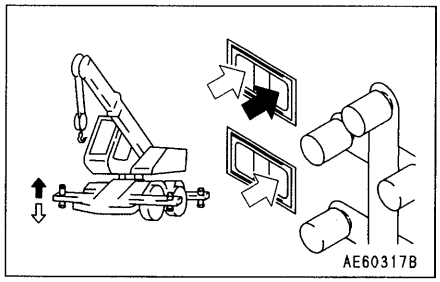
- **During crane operations there is danger of mistaken operation of the outriggers or the gear shift lever which may make the tires move. To prevent this, always set the PTO switch to the "Work 2" position when carrying out crane operations.**
- **When carrying out operations on soft ground, uneven ground, or slopes, use blocks to match the conditions of the work site and make the machine horizontal.**
- **Use wooden blocks in flat areas such as asphalt or concrete road surfaces where there is danger that direct contact between the outrigger floats and the road surface may cause the damage to the road surface.**
  On soft ground or uneven ground, the blocks may break if the load is unbalanced.
- **When extending the outrigger slide, check first that there is no obstruction. If the outrigger contacts with any obstacle, the slide cylinder may be damaged.**
- **When the outrigger floats are in contact with the ground, do not extend or retract the slide. This will damage the slide cylinder.**

NOTICE

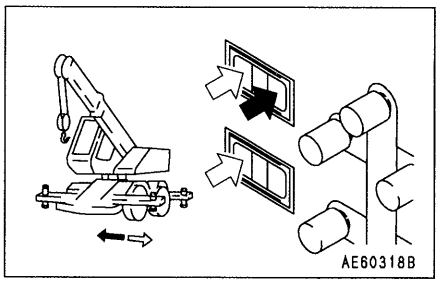
For the safety, be sure to return the switch to neutral after finishing the outrigger operation. In order to simplify the extending and stowing-away operation, the outrigger switches at the upper and lower side can be operated at any position.

The relationship between the outriggers and the outrigger setting switches is as follows.

- Outrigger jack operation

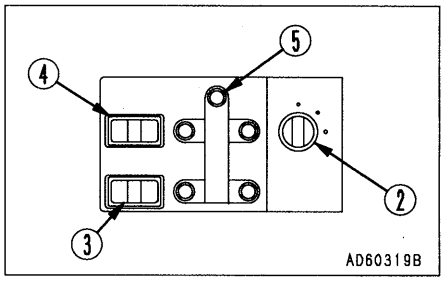


- Outrigger slide operation

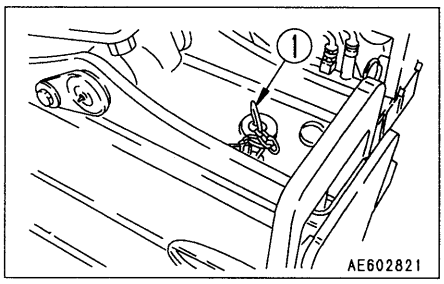


12.17.2 EXTENDING OUTRIGGERS

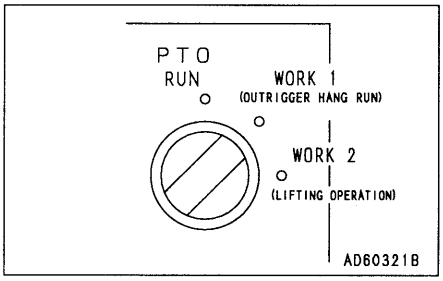
EXTENDING OUTRIGGERS FULLY



1. Remove the four outrigger slide stopper pins ①.

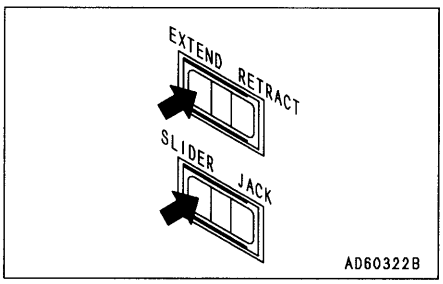


2. Run the engine at low idling, and turn PTO switch ② to the "WORK 1" position.

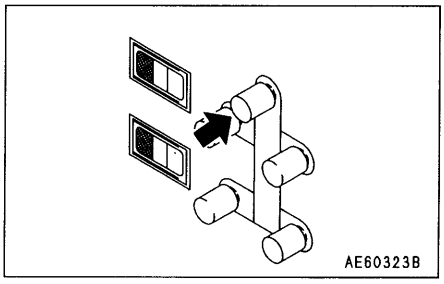


3. Set JACK/SLIDER operation switch ③ on the outrigger control panel to the SLIDER position (the lamp (red) inside the switch lights up).

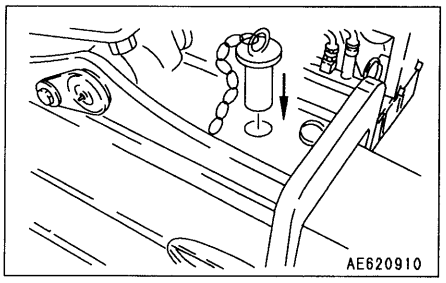
4. Set EXTEND/RETRACT switch ④ to the EXTEND position (the lamp (red) inside the switch lights up).



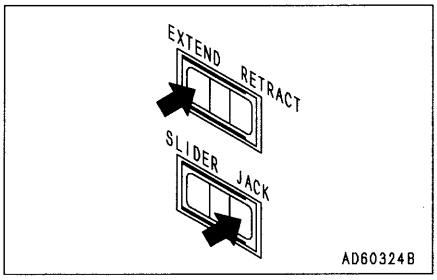
5. Press ALL switch ⑤ and extend the outriggers fully.



6. Fix the outrigger with the stopper pin ①.
   If this pin can not be inserted easily, slightly down the jack and insert the pin.

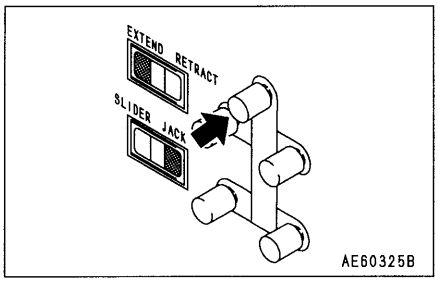


7. Set JACK/SLIDER operation switch ③ to the JACK position (the lamp (red) inside the switch lights up).



8. Press ALL switch ⑤ and extend the jacks fully.

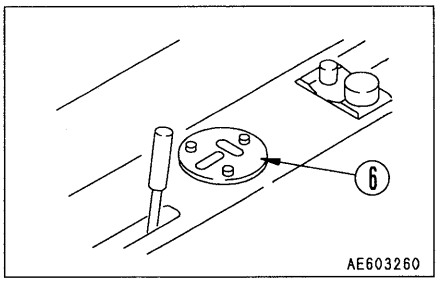
REMARK
When the switch is released, it will automatically return to its original position.



9. When the jack cylinders are fully extended, check the spirit level ⑥ to confirm that the machine is in a horizontal position.

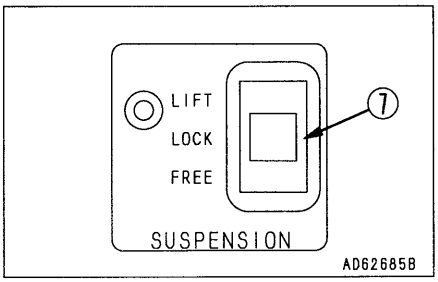
10. If it is not horizontal, operate the individual outriggers to make it horizontal.

11. After setting the outriggers in position, return the outrigger switch to the neutral position.

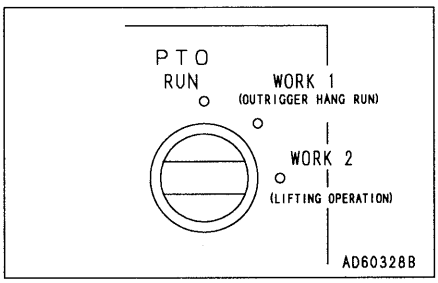


12. Set suspension switch ⑦ to the LIFT position to retract the suspension cylinder, and make sure that the axle stopper is contacting with the frame. (4 places of front, rear, left and right)

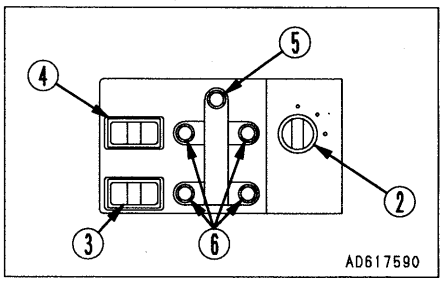
13. Turn the suspension switch to the LOCK position.
(If it is released at the LIFT position, it is set to the LOCK position.)



14. Set the PTO switch ② to the "WORK 2" position.



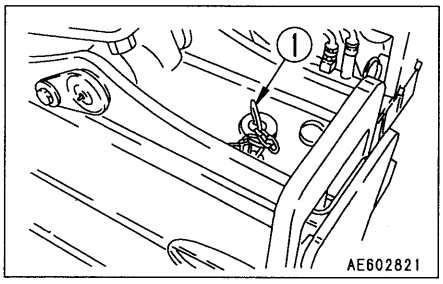
PARTIAL EXTENSION, MINIMUM EXTENSION



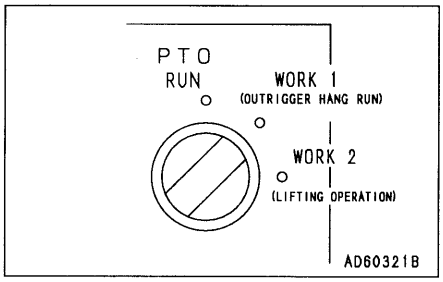
⚠ WARNING

- **The outriggers can be partially extended to 5.9 m (19 ft 4 in), 5.2 m (17 ft 1 in), 4.5 m (14 ft 9 in) 3.8 m (12 ft 6 in). When extending the outriggers to any other position, see "12.35 SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)".**
- **The minimum extension position for the outriggers can be set only for machines with H-shaped outriggers. The minimum extension for machines with X-shaped outriggers is 3.8 m (12 ft 6 in).**

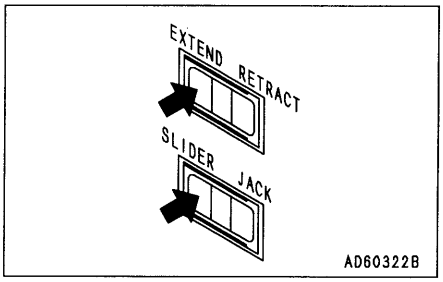
1. Remove the four outrigger slide stopper pins ①.



2. Run the engine at low idling, and turn PTO switch ② to the "WORK 1" position.

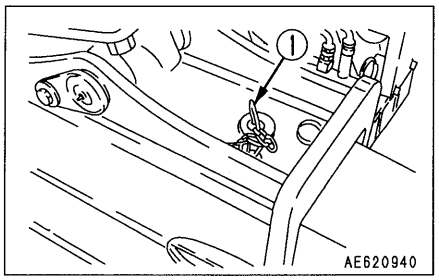


3. Set JACK/SLIDER operation switch ③ on the outrigger control panel to the SLIDER position (the lamp (red) inside the switch lights up).
4. Set EXTEND/RETRACT switch ④ to the EXTEND position (the lamp (red) inside the switch lights up).



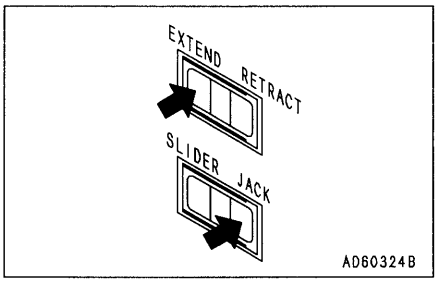
5. Press ALL switch ⑤ and extend the outriggers to the desired position.

6. Fix the outrigger with the stopper pin ①.
If this pin can not be inserted easily, slightly down the jack and insert the pin.



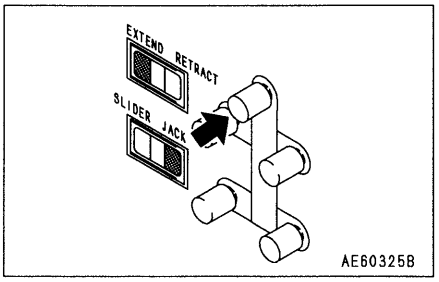
REMARK
The slide stopper pin is inserted by the force of a spring.
If it does not enter the inner box easily, operate the outriggers individually.
Check that all four pins have entered the holes securely.

7. Set JACK/SLIDER operation switch ③ to the JACK position (the lamp (red) inside the switch lights up).



8. Press ALL switch ⑤ and extend the jacks fully.

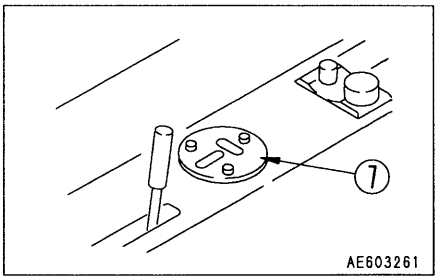
REMARK
When the switch is released, it will automatically return to its original position.



9. When the jack cylinders are fully extended, check the spirit level ⑦ to confirm that the machine is in a horizontal position.

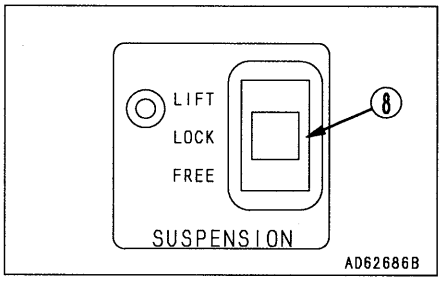
10. If it is not horizontal, operate the individual outriggers to make it horizontal.

11. After setting the outriggers in position, return the outrigger switch to the neutral position.

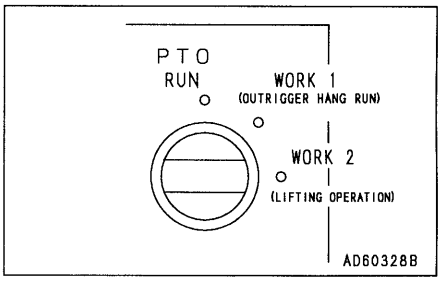


12. Set suspension switch ⑧ to the LIFT position to retract the suspension cylinder, and make sure that the axle stopper is contacting with the frame (4 places of front, rear, left and right).

13. Turn the suspension switch to the LOCK position.
(If it is released at the LIFT position, it is set to the LOCK position.)

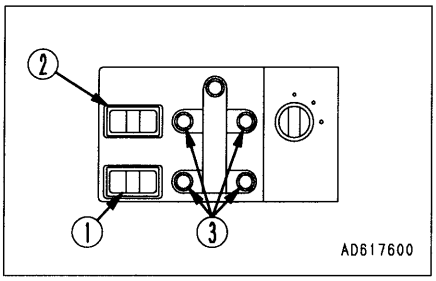


14. Set PTO switch ② to the "WORK 2" position.

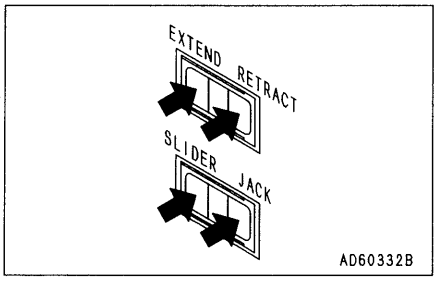


12.17.3 INDIVIDUAL OPERATION

When operating the outriggers individually, do as follows.

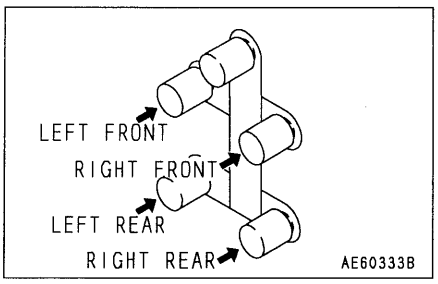


1. Set JACK/SLIDER switch ① to the JACK or SLIDER position (the lamp (red) inside the switch lights up).

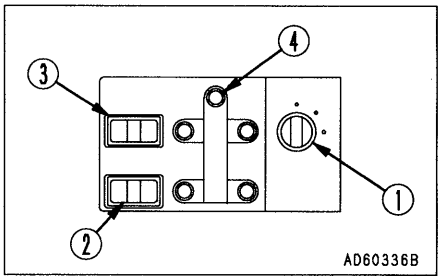


2. Set EXTEND/RETRACT switch ② to the EXTEND or RETRACT position (the lamp (red) inside the switch lights up).

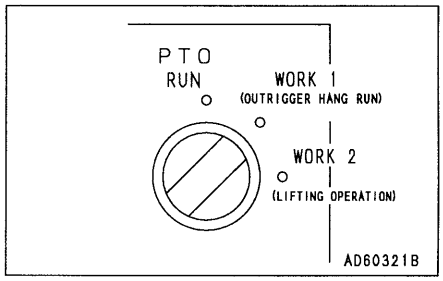
3. Press switch ③ for the outrigger that is to be operated. These switches can be used to operate the jack or slide individually for the outrigger.



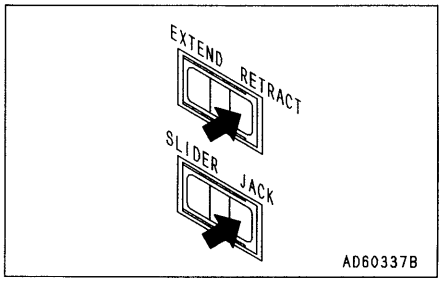
12.17.4 STOWING



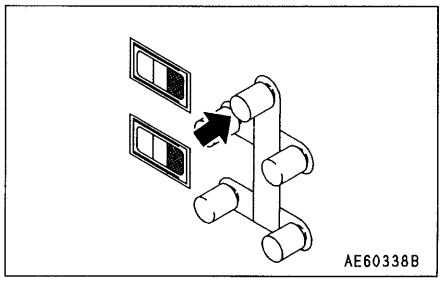
1. Set PTO switch ① to the "WORK 1" position.



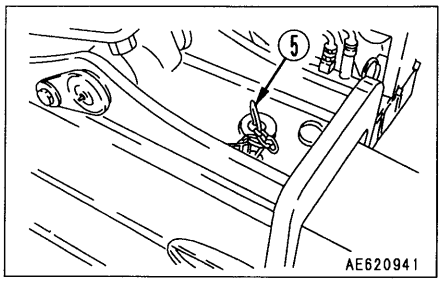
2. Set JACK/SLIDER operation switch ② to the JACK position (the lamp (red) inside the switch lights up).
3. Set EXTEND/RETRACT switch ③ to the RETRACT position (the lamp (red) inside the switch lights up).



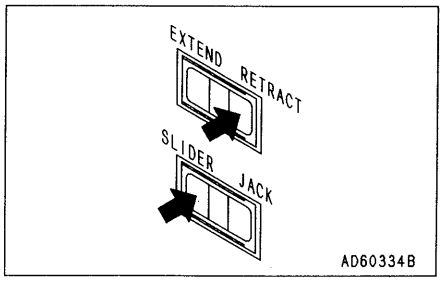
4. Press ALL switch ④ to stow the jacks.



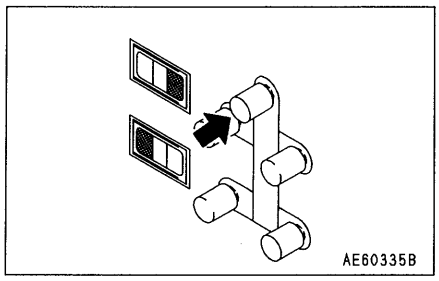
5. Remove the four slide stopper pins ⑤ (four).



6. Set JACK/SLIDER operation switch ② to the SLIDER position.

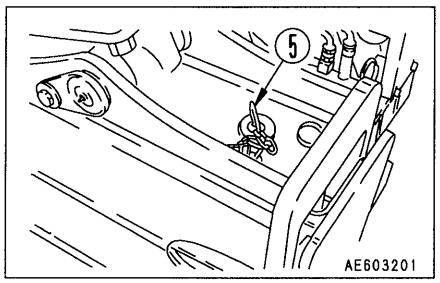


7. Press ALL switch ④ to stow the outriggers.



8. Set the four slide stopper pins ⑤ (four) in the lock holes.

9. After completing the operation, return the outrigger switch to the neutral position.



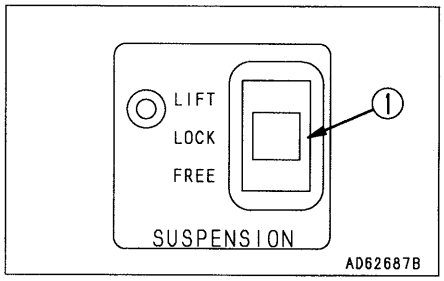
12.18 WHEN OUTRIGGERS ARE NOT USED (ON-TIRE OPERATIONS)

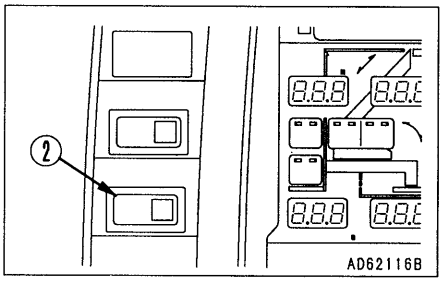
When operations are carried out without using the outriggers, carry out the following preparations and precautions.

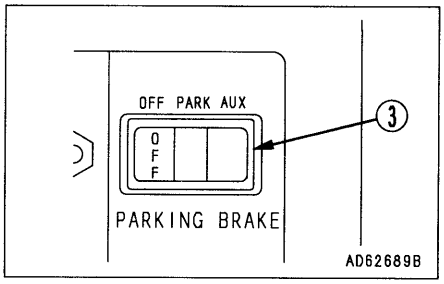
12.18.1 STATIONARY OPERATION

⚠ WARNING

- **When carrying out operations without using the outriggers, pay careful attention to the following points.**
  - **Make sure to lock the accelerator and the frame by the suspension switch.**
    In addition, unless the axle stopper contacts with the frame, they cannot be locked.
  - **The rated overall load is different depending on the working area. When swinging from the front to the side with loading, always carry out the 360° operation. When overloaded, the machine may fall down.**
  - **Set the lower operation mode setting switch of the MOMENT LIMITER (overload prevention system) to "On-tire stationary" position.**
  - **Check the tire inflation pressure. When it is below the specified value (0.9 MPa (9.0 kgf/cm²)), fill the air to the specified value.**
  - **It is prohibited to operated the works of jib and exceeding the specified boom length and the free-fall operation.**
  - **It is prohibited to use this in the swing-free.**
  - **When carrying out the lifting operation at front, insert the swing lock pin.**
  - **When carrying out the stationary lifting operation, position the machine on level and stable hard ground.**
  - **During the crane operation, apply the auxiliary brake.**
  - **When swinging with a raised load, the side leaning is larger than the forward and the backward, and this may cause overload, and the machine to fall down.**
    Therefore, when swinging, operate the crane so as to correct the work radius and swing slowly.
  - **Do not work with the boom length more than 25.9m (84 ft 11 in).**
  - **During crane operations, there is danger of mistaken operation of the gear shift lever which may make the tires move. To prevent this, always set the PTO switch to the "WORK 2" position when carrying out crane operations.**







1. Set the PTO switch to the "WORK 1" position.

2. Set suspension switch ① to the LIFT position to retract the suspension cylinder, and make sure that the axle stopper contacts with the frame (4 places of front, rear, left and right).

3. Turn the suspension switch to the LOCK position.
   (If it is released at the LIFT position, it is set to the LOCK position.)

4. Check that the tire inflation pressure is 0.9 MPa (9.0kgf/cm^2).

5. Set the front and rear wheels parallel to the chassis.

6. Set swing free switch ③ to the LOCK position.

7. Set parking brake switch ④ to the AUXILIARY BRAKE position. At this time, the indicator lamp inside the combination meter lights up.

8. Set the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) carrier operating mode setting switch to the "On-tire" position.

9. Set the PTO switch to the "WORK 2" position, then carry out the crane operation.

12.18.2 TRAVELING WITH RAISED LOAD

⚠ WARNING

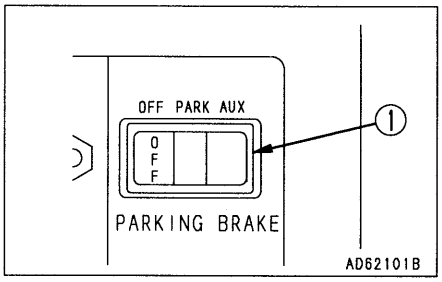
When traveling with the raised load, take the following precautions.

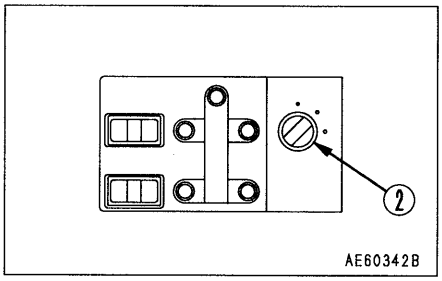
- **Lock securely the axle and the frame with the suspension switch.**
  In this case, unless the axle stopper touches the frame, they cannot be locked.
- **When traveling with a raised load, do not the operate the crane.**
- **Check of the condition of the ground, the surrounding area, and the operating conditions before starting to travel.**
- **Set the 4-wheel drive switch and low switch to 4WD LO, or set the travel mode selector switch to TORQUE CONVERTER and the gear shift lever to L, 2, or R when traveling.**
- **Do not shift gear when traveling.**
- **Before starting to travel,**
  - **Apply the swing brake or apply the swing lock lever.**
  - **Turn parking brake switch ① to the OFF position.**
  - **Set the swing free switch to the LOCK position.**
- **Travel at a maximum speed of 1.6km/h (1 MPH), hold the load close to the ground surface to prevent it from swaying, and be particularly careful when cornering, or starting or stopping suddenly.**
- **When stopping the machine, do the following before starting the crane operation.**
  - **Release the swing brake or swing lock.**
  - **Set parking brake switch ① to the AUXILIARY BRAKE position.**

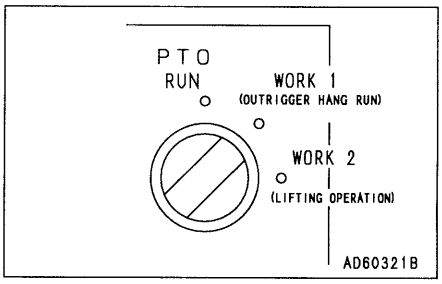
Set PTO switch ② to the "WORK 1" position. The machine cannot travel in the "WORK 2" position.

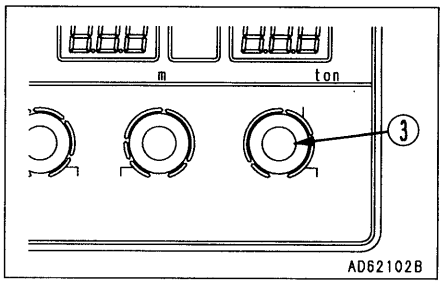
For operating the suspension lock, see Step 2 and 3 of "12.18.1 STATIONARY OPERATION".

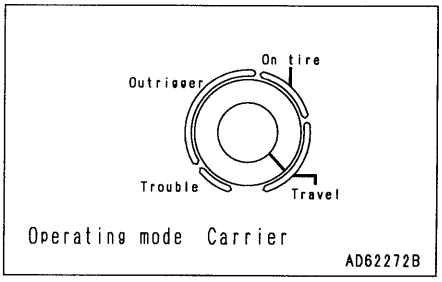
Set the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) carrier operating mode setting switch ③ to the "Travel" position.











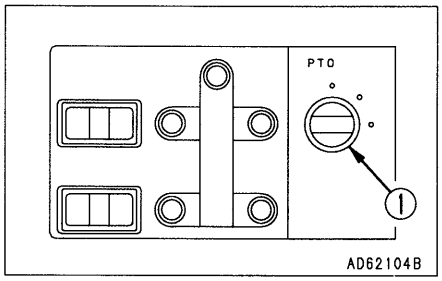
12.19 MAIN WINCH OPERATIONS

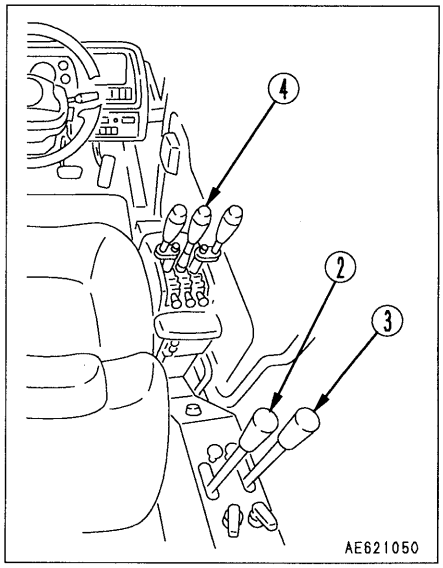
12.19.1 CHECKS, PREPARATION BEFORE OPERATION

⚠ WARNING

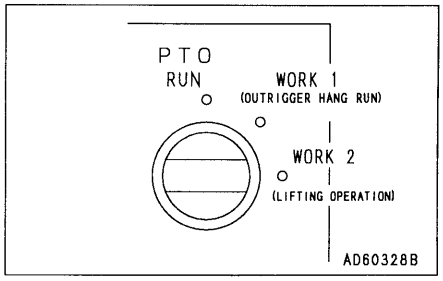
- **Sudden operation of the working equipment causes the load shake and it may cause the damage of the crane and injury.**
- **Check that both the main winch and auxiliary winch clutch levers are at the ON position, and that the auxiliary winch lever is locked before starting operations.**
- **If the winch drum lock lever is locked when operating the crane (winding-in and winding-out), the raised load is stopped suddenly, as a result it may cause an unexpected accident. Never touch to winch drum lock lever during work.**
- **It is forbidden to pull aside or retract the load by operating the winch. It may cause the crane turned over.**
- **Do not move the clutch levers to the OFF position when the engine is stopped unless the hook has been lowered to the ground. This causes the interlock disable.**
- **In the condition of lifting a load, the operation radius becomes larger due to the boom bending and it causes the overload depending on the lifting load.**
  When lifting, just after leaving the ground, stop lifting, and make sure not to overload.
- **Dropping the accumulator pressure influences the performance of the winch clutch, and this may cause the accident such as the load dropping.**
  During operation, when the alarm buzzer sounds to indicate the pressure dropping or the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) displays it, stop the operation immediately and charge the accumulator.
- **When taking the machine out of long-term storage, the performance of the winch brake or the winch clutch may be lower due to the rust.**
  When using again, check performance before use.
- **After operation, set the lock knob of the control lever to "LOCK". In addition, tilt the lever stand backward.**

Before starting operations, carry out the following preparations.

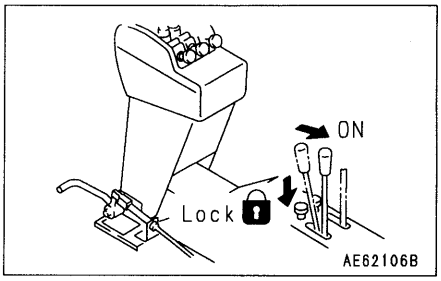




1. Set PTO switch ① to the "WORK 2" position.



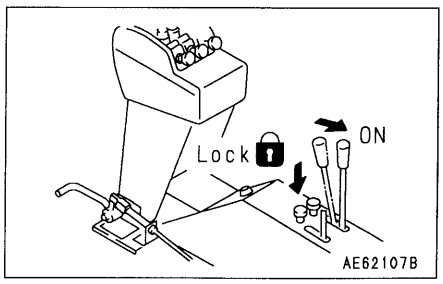
2. Set auxiliary winch clutch lever ② to the ON position and set the lock pin to the LOCK position.



3. Set main winch cluch lever ③ to the ON position and set the lock pin to the LOCK position.

REMARK

Remove the lock only when carrying out free-fall operations.



4. Release the lock of winch lever ④.

5. Check that the auxiliary winch lever is locked.

12.19.2 WINDING-IN, WINDING-OUT OPERATIONS

⚠ WARNING

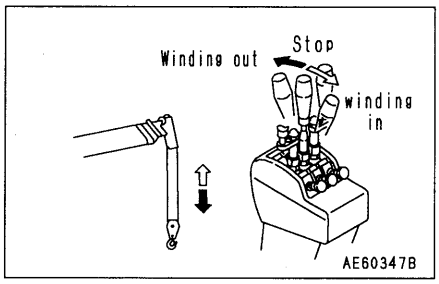
- **Be careful when raising a load. The boom will bend, so the load will move slightly to the front.**
- **When a load has been raised, never operate the main winch clutch lever.**
- **When holding a load in mid-air, always keep the main winch brake pedal depressed.**
  In addition, to keep the load stopped securely, set the main winch drum lock knob to the LOCK position.
- **If the main winch clutch lever has to be operated when a load is being held in mid-air, always keep the main winch brake pedal depressed while operating.**

NOTICE

If the hoist telescope or jib tilt lever is operated fully, the winding-in operation cannot be carried out at high speed.

Operate the main winch control lever as follows.

- Winding in: Pull the lever back
- Stop: Place the lever at neutral
- Winding out: Push the lever forward gradually

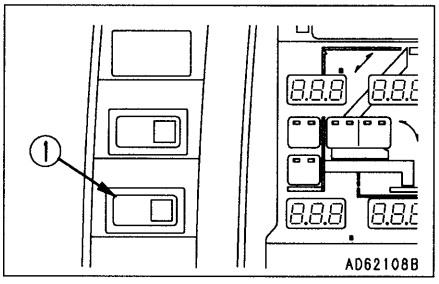


Adjust the speed when winding in and winding out by adjusting the movement of the main winch lever and the accelerator pedal.

REMARK

When winding in with the swing switch at the LOCK position, it is possible to press switch ① on the left side of the front panel (swing free switch) to free the swing and prevent the load from swaying to the
side.

When the load leaves the ground, place the switch to the LOCK position.

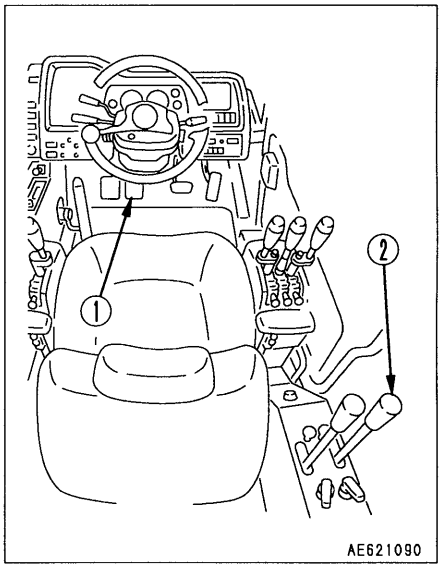


12.19.3 FREE-FALL OPERATION

⚠ WARNING

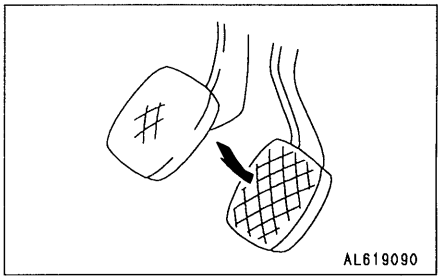
When carrying out free-fall operations, never remove your foot from main winch brake pedal ①.

- **When carrying out free-fall operations, be careful of the following.**
  - **Depress the main winch brake pedal, and then operate the clutch lever from "ON" to "OFF".**
  - **As a basic rule, the free-fall operation is used only when lowering the hook without a load, but if the free-fall operation is used when there is a load, the load must be less than 1/5 of the rated overall load.**
  - **Do not operate the lever or pedal suddenly.**
  - **Adjusting the lowering speed, carefully carry out the free-fall operation.**
  - **Set the machine on firm horizontal ground with the outrigger fully extended.**
- **When operating the main winch clutch lever from the OFF position to the ON position, always move the lever to the bottom position and check that it is ON, then slowly release the main winch brake pedal. When releasing the pedal, apply the lock to the main winch cluch lever.**
- **Never carry out free-fall operations when the wire rope is pulled out to near the end of its maximum length or when carrying out work below ground level.**
  There is danger that the wire rope may brake or be wound back on to the drum in reverse.

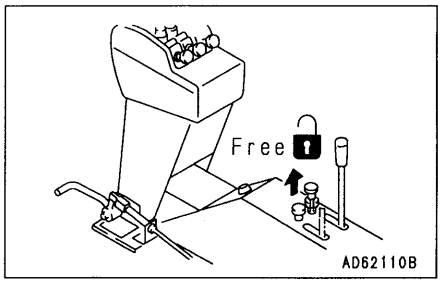


AE621090

1. Depress the main winch brake pedal ①.
   If this pedal is not depressed, the clutch lever operations cannot be carried out because of the free-fall interlock system.


AL619090

2. Set the lock pin of main winch clutch lever ② to the FREE position.

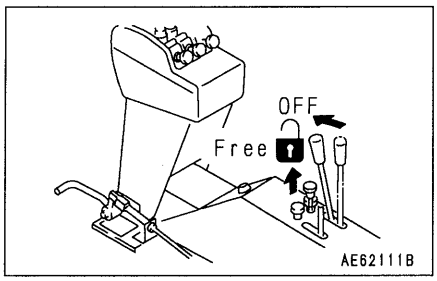


AD62110B

3. Push main winch clutch lever ② to the OFF position. Keep main winch brake pedal ① depressed when doing this.

4. Adjust the amount that main winch brake pedal ① is depressed to control the down speed.

5. When the load comes near to the position where it is to be stopped, gradually depress main winch brake pedal ①.



REMARK

For reference, there is a yellow mark on the main wire rope over a range of approx. 60 m (197 ft) from the drum mount.

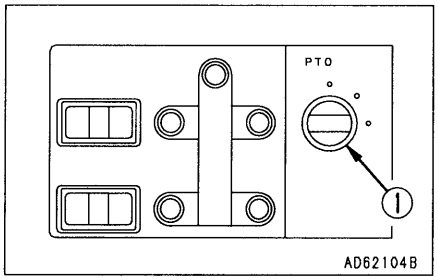
12.20 AUXILIARY WINCH OPERATIONS

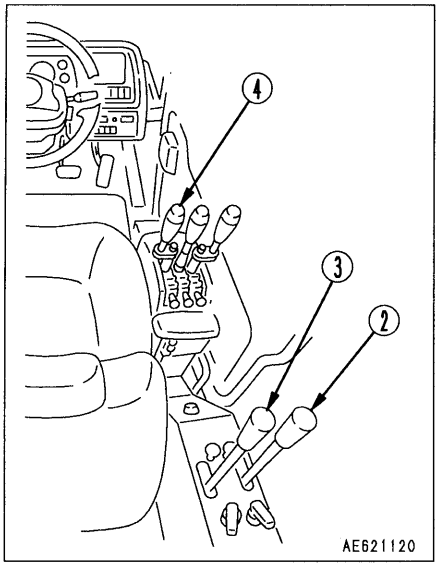
12.20.1 CHECKS, PREPARATION BEFORE OPERATION

⚠ WARNING

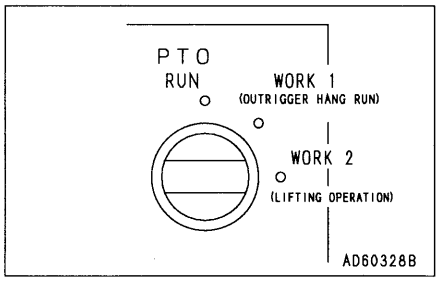
- **Sudden operating the working equipment causes the load to shake and it may cause the damage of the crane and injury.**
- **Check that both the main winch and auxiliary winch clutch levers are at the ON position, and that the main winch lever is locked before starting operations.**
- **If the winch drum lock lever is locked when operating the crane (winding-in and winding-out), the raised load is stopped suddenly, as a reult it may cause an unexpected accident. Never touch winch drum lock lever during work.**
- **It is foridden to pull aside or retract the load by operating the winch. It may cause the crane to turn over.**
- **Do not move the clutch levers to the OFF position when the engine is stopped unless the hook has been lowered to the ground. This causes the interlock disable.**
- **In the condition of lifting a load, the operation radius becomes larger due to the boom bending and it causes the overload depending on the lifting load.**
  When lifting, just after leaving the ground, stop lifting, and make sure the crane is not over loaded.
- **Dropping the accumulator pressure influences the performance of the winch clutch, and this may cause the accident such as the load dropping.**
  During operation, when the alarm buzzer sounds to indicate the pressure dropping or the MOMENT LIMITER (overload preventive system) displays it, stop the operation immediately and charge the accumulator.
- **When taking the machine out of long-term storage, performance may be lower for the winch brake or the winch clutch due to rust.**
  When using again, check performance before using.
- **After operation, set the lock knob of the control lever to "LOCK". In addition, tilt the lever stand backward.**

Before starting operations, carry out the following preparations.

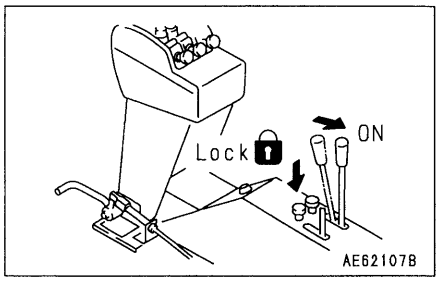




1. Set PTO switch ① to the "WORK 2" position.



2. Set main winch clutch lever ② to the ON position and set the lock pin to the LOCK position.

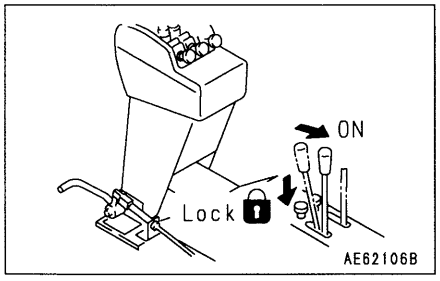


3. Set auxiliary winch clutch lever ③ to the ON position and set the lock pin to the LOCK position.

REMARK
Remove the lock only when carrying out free-fall operations.

4. Release the lock of auxiliary winch lever ④.

5. Check that the main winch lever is locked.



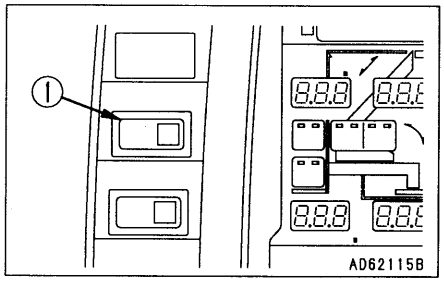
12.20.2 WINDING-IN, WINDING-OUT OPERATIONS

⚠ WARNING

- **Be careful when raising a load. The boom will bend, so the load will move slightly to the front.**
- **When a load has been raised, never operate the auxiliary winch clutch lever.**
- **When holding a load in mid-air, always keep the auxiliary winch brake pedal depressed.**
  In addition, to keep the load stopped securely, set the auxiliary winch drum lock knob to the LOCK position.
- **If the auxiliary winch clutch lever has to be operated when a load is being held in mid-air, always keep the auxiliary winch brake pedal depressed while operating.**

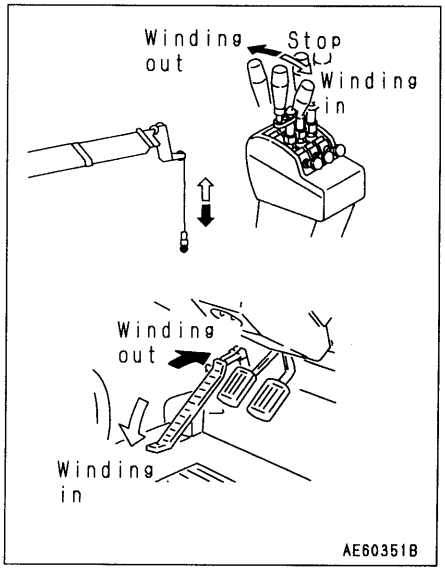
NOTICE

If either the hoist or telescope lever is operated fully, the winding-in operation cannot be carried out at high speed.



Operate the auxiliary winch control lever as follows.
When operating with pedal, push the switch ① at the side of the front panel (pedal selector switch) toward auxiliary winch.

- Winding in: Pull the lever back, or depress the pedal backward
- Stop: Place the lever at neutral, or set the pedal to neutral (release hand and foot slowly)
- Winding out: Push the lever forward gradually, or depress the pedal forward gradually

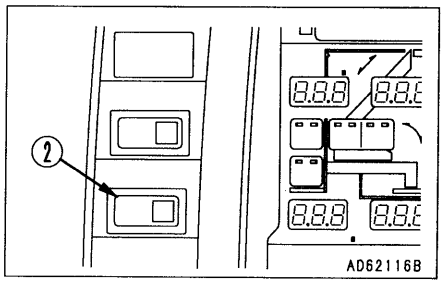


Adjust the speed when winding in and winding out by adjusting the movement of the auxiliary winch lever and the accelerator pedal.

REMARK

When winding in with the swing switch at the LOCK position, it is possible to press switch ② on the left side of the front panel (swing free switch) to free the swing and prevent the load from swaying to the side.

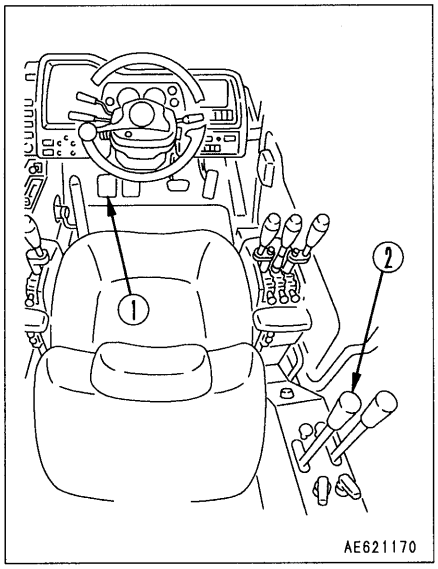
When the load leaves the ground, place the switch to the LOCK position.



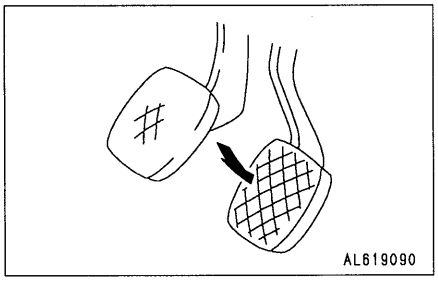
12.20.3 FREE-FALL OPERATION

⚠ WARNING

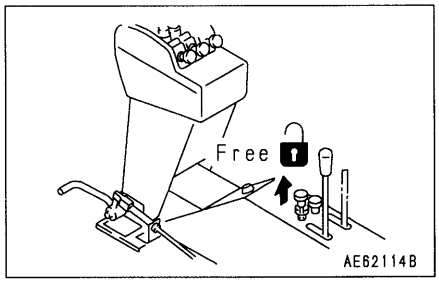
- **When carrying out free-fall operations, never remove your foot from main winch brake pedal ②.**
- **When carrying out free-fall operations, be careful of the following.**
  - **○ Depress the auxiliary winch brake pedal, and then operate the clutch lever from "ON" to "OFF".**
  - **○ As a basic rule, the free-fall operation is used only when lowering the hook without a load, but if the free-fall operation is used when there is a load, the load must be less than 1/5 of the rated overall load.**
  - **○ Do not operate the lever or pedal suddenly.**
  - **○ Adjusting the lowering speed, carefully carry out the free-fall operation.**
  - **○ Set the machine on firm horizontal ground with the outrigger fully extended.**
- **When operating the auxiliary winch clutch lever from the OFF position to the ON position, always move the lever to the bottom position and check that it is ON, then slowly release the auxiliary winch brake pedal. When releasing the pedal, apply the lock to the auxiliary winch cluch lever.**
- **Never carry out free-fall operations when the wire rope is pulled out to near the end of its maximum length or when carrying out work below ground level.**
  There is danger that the wire rope may brake or be wound back on to the drum in reverse.



1. Depress the auxiliary winch brake pedal ①.
   If this pedal is not depressed, the clutch lever operations cannot be carried out because of the free-fall interlock system.



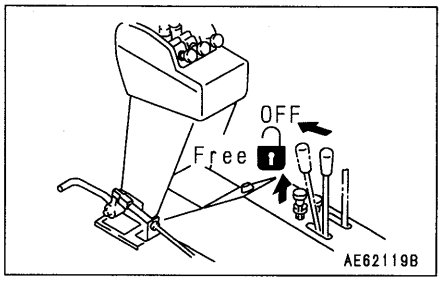
2. Set the lock pin of auxiliary winch clutch lever ② to the FREE position.



3. Push auxiliary winch clutch lever ② to the OFF position. Keep auxiliary winch brake pedal ① depressed when doing this.

4. Adjust the amount that auxiliary winch brake pedal ① is depressed to control the down speed.

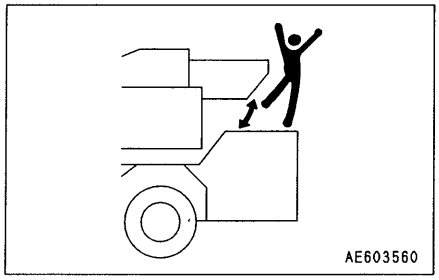
5. When the load comes near to the position where it is to be stopped, gradually depress auxiliary winch brake pedal ①.



REMARK

For reference, there is a yellow mark on the auxiliary wire rope over a range of approx. 85 m (278 ft 8 in) from the drum mount.

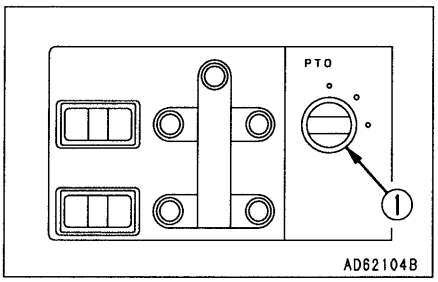
12.21 BOOM HOIST OPERATIONS



⚠ WARNING

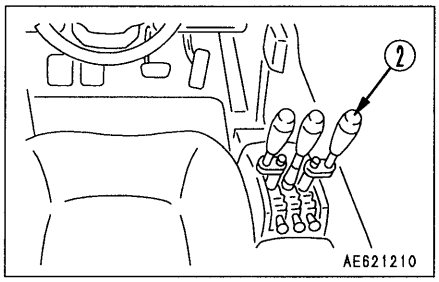
PRECAUTIONS FOR OPERATION

- **The second boom projects more than the rear edge of the boom (base), so check that there are not persons behind the boom before operating. The boom will move suddenly and it may cause injury.**
- **There is danger of the machine overturning, so do not lower the boom beyond the danger angle in the rated overall load table.**

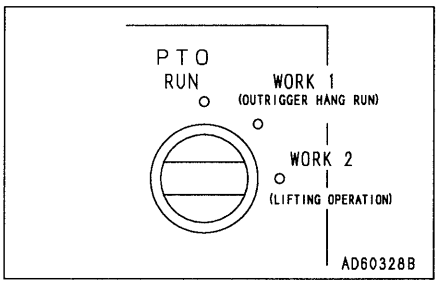


NOTICE

- **Be extremely careful when lowering the boom with a raised load. If the boom is lowered in this condition, the load will sway, and may cause overload.**
- **When lowering the boom, operate the lever slowly.**

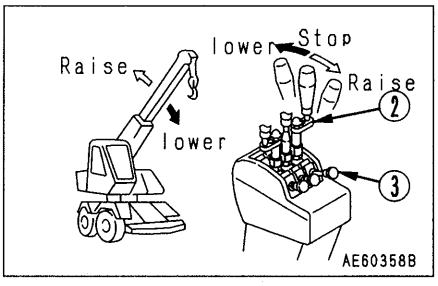


1. Set PTO switch ① to the "WORK 2" position.

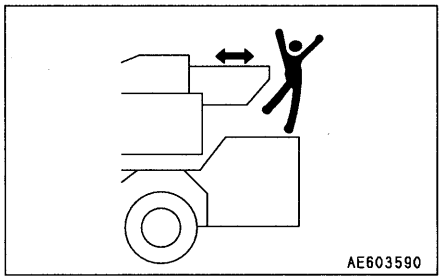


2. Remove the lock pin from the hoist lever ③.

3. Operate boom hoist lever ② as follows.
   - Boom RAISE: Pull the lever back
   - Stop: Set the lever to the neutral position. (Release the lever and pedal slowly.)
   - Boom LOWER: Push the lever forward



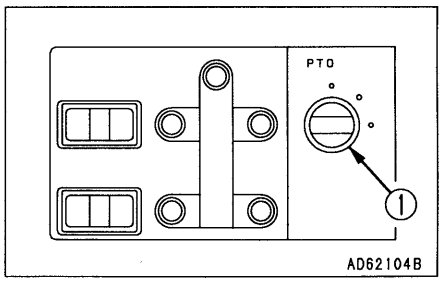
12.22 BOOM TELESCOPE OPERATIONS



⚠ WARNING

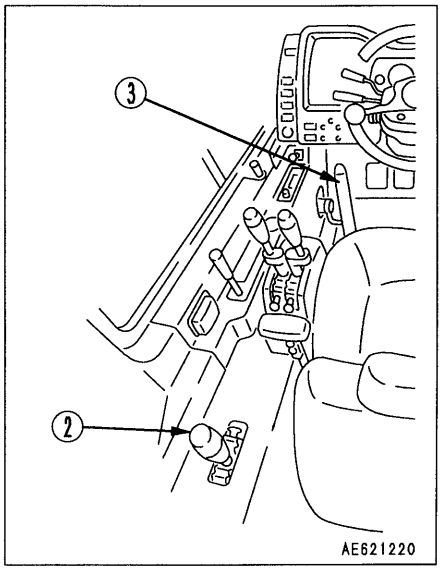
Precautions when operation

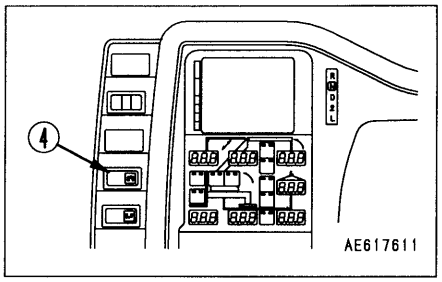
- **Do not pull the load sideways or pull it in. It may cause the crane damaged.**
- **When the boom is retracted, the second boom projects more than the rear edge of the boom (base), so check that there are not persons behind the boom before operating. The boom will move suddenly and it may cause injury.**
- **When the boom is extended or retracted, the hook is also wound in or out, so operate the winch at the same time to adjust the height of the hook.**
- **If the boom is kept extended for a long time, the change in the temperature of the hydraulic oil will cause the boom to retract slightly. If this happens, operate the boom telescope lever to extend the boom and maintain the position.**



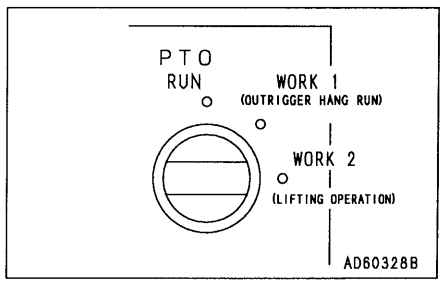
NOTICE

- **When extending the boom with a raised load, always be particularly careful to operate the lever slowly, regardless of the size of the load.**
- **When the boom is extended, the hook is wound in at the same time, so be careful not to overwind.**
- **The limit to which the boom can be extended or retracted with a raised load is the rated overall load for that working radius. Be extremely careful when extending the boom with a raised load because it is easy to cause overload.**
- **When changing from the second boom to the third boom or vice versa, the load is shaked with a shock. Loosen the accelerator pedal or slow down the operating speed with the control lever around the boom switching area.**



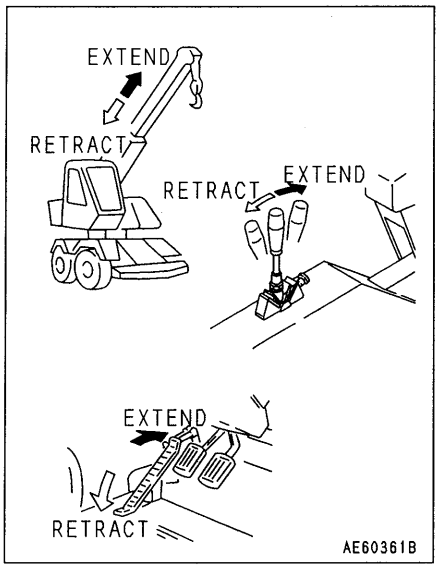


1. Set PTO switch ① to the "WORK 2" position.



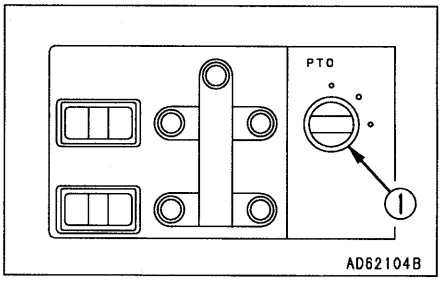
2. Operate boom telescope control lever ② as follows.
When operating with pedal ③, push the switch ④ at the left side of the front panel (pedal selector switch) toward telescoping side (the lamp (orange) inside the switch lights up).

- EXTEND: Push the lever down or depress the front of the pedal
- STOP: Set the lever and pedal to the neutral position. (Release the lever and pedal slowly.)
- RETRACT: Pull the lever up or depress the back of the pedal.

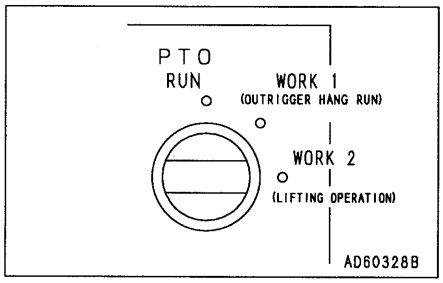


12.23 BOOM TELESCOPE SELECTOR OPERATIONS

If it is necessary to extend or retract the boom in a different way from the automatic telescope operation, such as when carrying out inspection and maintenance, use the boom selector switch to carry out the telescope operation.



- Set PTO switch ① to the "WORK 2" position.

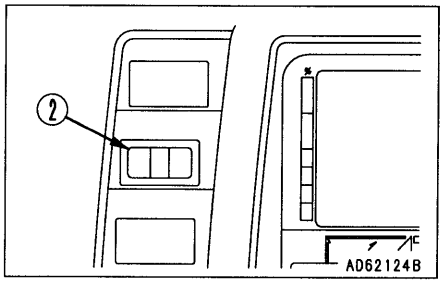


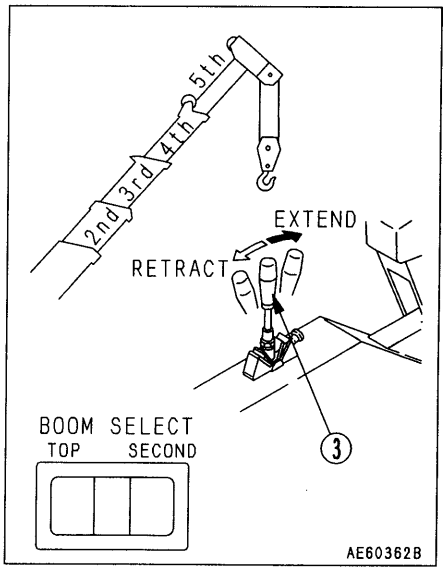
12.23.1 POSITION OF BOOM SELECT SWITCH AND MOVEMENT OF BOOM

⚠ WARNING

When operating the crane, never press the boom select switch. This may cause damage to the machine.

1. Operate boom selector switch ② as follows.
   - TOP position of the selector switch
     The 3rd, 4th and top stages are extended or retracted at the same time.
   - BOOM position of the selector switch
     After the 2nd stage is extended, the 3rd, 4th and top stages are extended at the same time. When the boom is retracted, the 3rd, 4th and top stages are retracted at the same time, then the 2nd stage is retracted.
   - SECOND STAGE position of the selector switch
     Only the 2nd stage is extended or retracted.
2. Operate boom telescope lever ③.

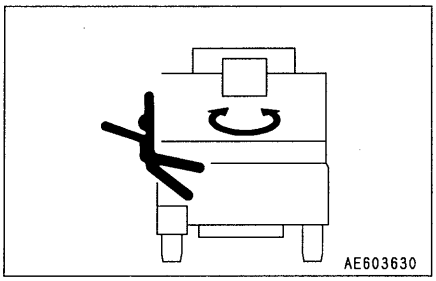




NOTICE

For normal operations, do not touch the boom select switch.

12.24 SWING OPERATIONS



⚠ WARNING

- **When the boom is stowed, the second boom projects more than the rear edge of the boom (base), so check that there are not persons behind the boom before operating. The boom will move suddenly and it may cause injury.**
- **Before swinging, sound the horn to warn people around the machine.**
- **Operate the lever slowly.**
  It is particularly dangerous to operate the levers suddenly when a load is raised. This will cause the load to sway.
- **When there is a difference in the rated overall load between over-front and over-side operations and between over-rear and over-side operations, the buzzer will sound intermittently when swing operations are carried out in the range between the danger zone and 15° before the danger zone. In such cases, carry out the swing operation carefully or stop the swing operation.**

⚠ CAUTION

When swinging with removing the stopper rope and opening the door of the engine hood thoroughly, the door of the engine hood will touch to the injected portion of the boom at the back of the boom (base), and it may be damaged. Always hook the stopper rope so as not to have the door opened thoroughly.

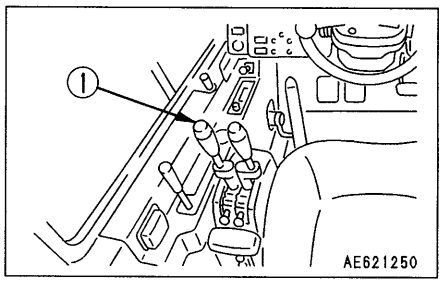
NOTICE

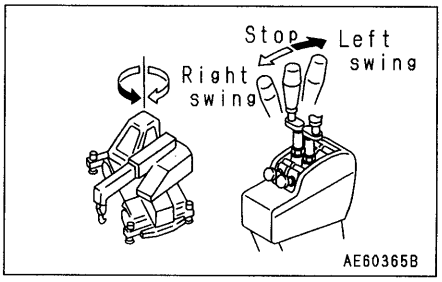
The rated overall load is different for over-front operations and 360° operations, so when swinging from the front to the side, be careful not to cause overload. Even if the alarm buzzer sounds, the swing operation is not stopped automatically, so stop the swing operation immediately.

When lifting a load off the ground at the front and swinging to the side, make sure to set the load shown in the rated overload load table for 360° operations when lifting the load off the ground at the front.

1. Before carrying out swing operations, check the following.
   - Is the swing lock brake lever "OFF"?
   - Is the swing lock pin released?
   - Is the swing free switch at "LOCK"?
   - Set swing lever lock knob to "FREE".

2. Operate swing control lever ① as follows.
   - Left swing: Push the lever to the front
   - Stop: Set the lever to the neutral position. (When the lever is released, the lever will return to the neutral position.)
   - Right swing: Pull the lever back





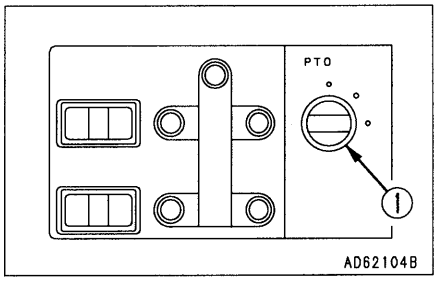
REMARK

There is a horn switch at the top of the swing control lever for sounding the horn during swing operations.

12.25 POWER TILT JIB HOIST OPERATIONS

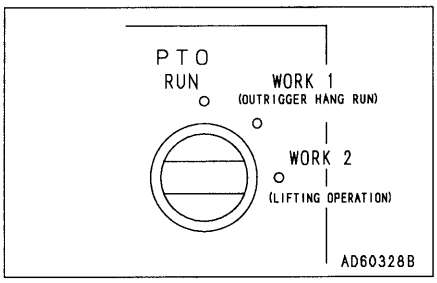
⚠ WARNING

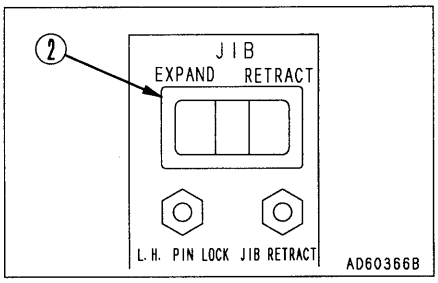
When tilting with a raised load, run the engine at idling and carry out the operation slowly.
When lowering the jib, the working radius will become larger, so be careful not to cause overload.
Do not raise the jib to pull the load sideways or to pull it in.



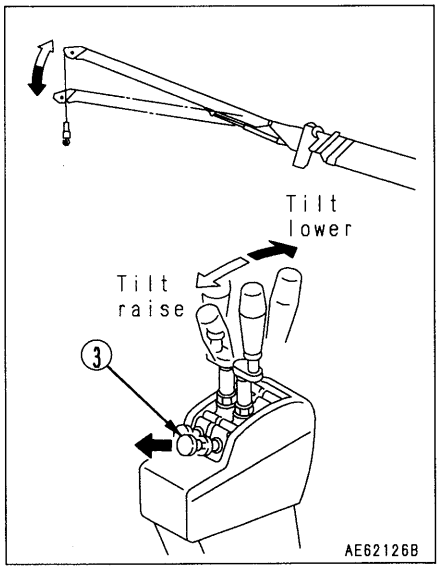
Before starting operation, carry out the following preparations.

- Set PTO switch ① to the "Work 2" position.
- Set jib EXTEND/SLIDER switch ② to "JIB" position.
- Remove the lock knob ③ from the power tilt jib control lever.
- Set the crane operating mode switch of the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) to the STATUS OF JIB EXTENDED (ONE-STAGE JIB, TWO-STAGE JIB).





1. Operate the jib tilt.
   Lower: Push lever
   Raise: Pull lever
   Stop : The jib is stopped and is kept at the same position. (Releasing the lever returns to the N position.)



12.26 PRECAUTIONS FOR OPERATION

12.26.1 REMOVING MAIN HOOK FROM TRAVEL POSTURE

1. Remove the main winch hook lock pin (main winch).
   Remove the auxiliary lock band (auxiliary winch).

2. Release the main and auxiliary winch drum locks.
   Wind in the main and auxiliary hooks slightly, and set the winch drum lock lever to the FREE position.

REMARK

Carry out the operation when the drum is locked.

3. Depress the main and auxiliary winch brake pedals, and set the main winch clutch lever to the OFF position and auxiliary cluch lever to "OFF" to set to the free-fall condition.
   Keep the main and auxiliary winch brake pedals depressed when doing this.

4. Use the main and auxiliary winch brake pedals to control the tension of the wire, and operate the boom hoist lever to the BOOM RAISE position to raise the boom.

REMARK

When doing this, be careful that the wire is not too tense or too slack.

If the wire is too slack, it will not wind on to the drum properly, and if it is too tense, there is danger that the weld at the hook holder link mount may be damaged or auxiliary winch lock rope may be cut.

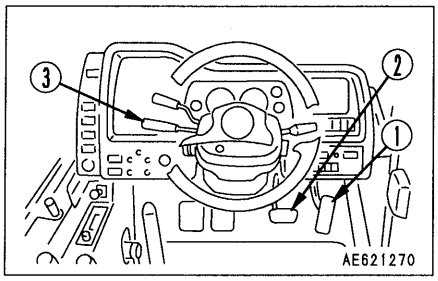
If the main and auxiliary winch clutch lever are at the ON position and the main and auxiliary winches are wound out while raising the boom, there will be no tension (the weight of the hook) on the wire, so the rotation of the winch drum will cause improper winding of the loops of wire on the inside.

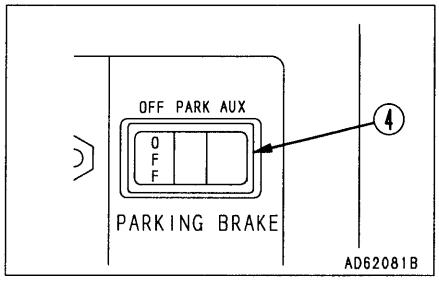
5. When the boom is raised to approx. 70°, stop the operation, set the main and auxiliary winch clutch lever to the ON position, then remove the main hook from the holder link, and auxiliary hook from the holder rope.

12.27 PARKING MACHINE

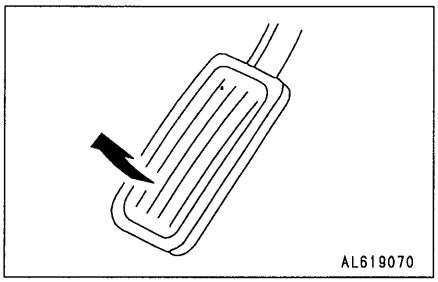
⚠ WARNING

- **Do not stop the machine suddenly except in emergencies. Use the braking force of the engine to slow down the machine before applying the foot brake, and leave room to spare when stopping.**
- **Park the machine on firm horizontal ground.**
  Do not park the machine on slopes.
  If the machine must be parked on a slope, block the wheels to prevent the machine from moving.
- **If the control levers are touched by accident, the machine may move suddenly.**
  When standing up from the operator's seat, tip the right control levers to the rear and place the lock pins of the winch clutch levers in the LOCK position.

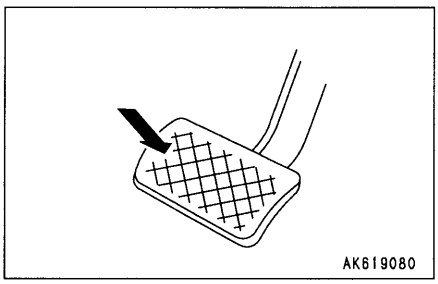




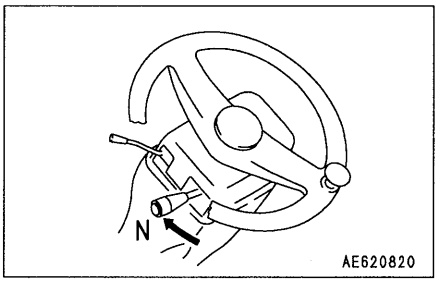
1. Release accelerator pedal ① and use the braking force of the engine to reduce the travel speed.



2. Depress brake pedal ② to apply the brake and stop the machine.



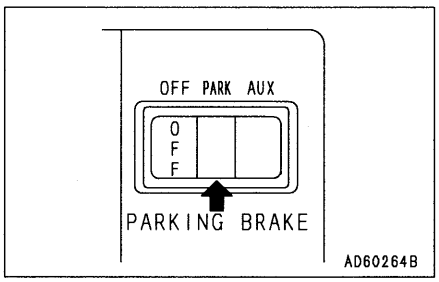
3. Move gear shift lever ③ to the N position.



4. Set parking brake switch ④ to the PARK position.
   At this time, the "PARK" indicator inside the combination meter lights up.

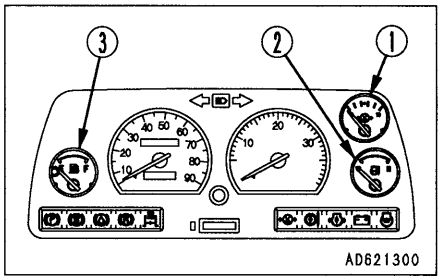
NOTICE

Except in emergencies, use the parking brake only when the machine has completely stopped.



12.28 CHECK AFTER FINISHING OPERATION

1. Use air pressure guage ① of the meters and lamps to check the air pressure, and use engine water temperature gauge ② and fuel level guage ③ to check the fuel remaining.

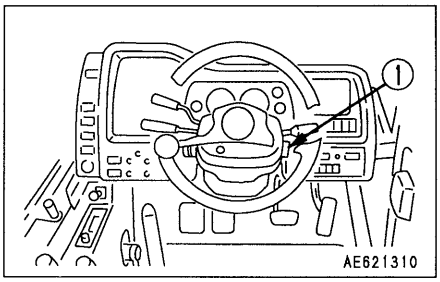


12.29 STOPPING ENGINE

NOTICE

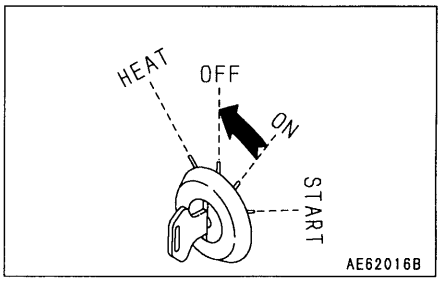
- **If the engine is stopped suddenly before it has cooled down, the life of all parts of the engine will reduced. Never stop the engine suddenly except in emergencies. If the engine has overheated, do not stop it suddenly, but run the engine at a mid-range speed to cool it down gradually.**
- **Never change the set value for the engine speed. If there is some abnormality in the engine speed, please contact your Komatsu distributor.**
  Changing the engine speed setting will not only mean that the engine will not be able to display its ability, but will also lead to damage of the equipment.
- **Always apply the parking brake when leaving the machine.**

1. Run the engine at low idling for 5 minutes to cool the engine down gradually.



2. Turn the key in starting switch ① to the OFF position to stop the engine.

3. Remove the key from starting switch ①.



12.30 CHECK AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, body work, and undercarriage, and check also for leakage of oil and water. If any leakage or abnormality is found, carry out repairs.

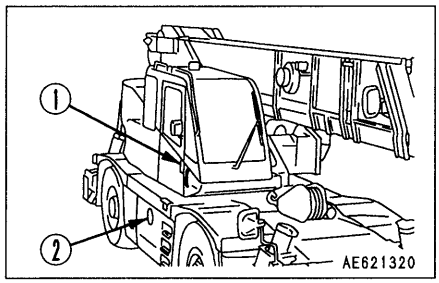
2. Fill the fuel tank.

3. Remove any waste paper or dead leaves from inside the engine room. These may cause a fire.

12.31 LOCKING

Always lock the following places.

① Cab
② Fuel tank filler cap



12.32 HANDLING JIB

⚠ WARNING

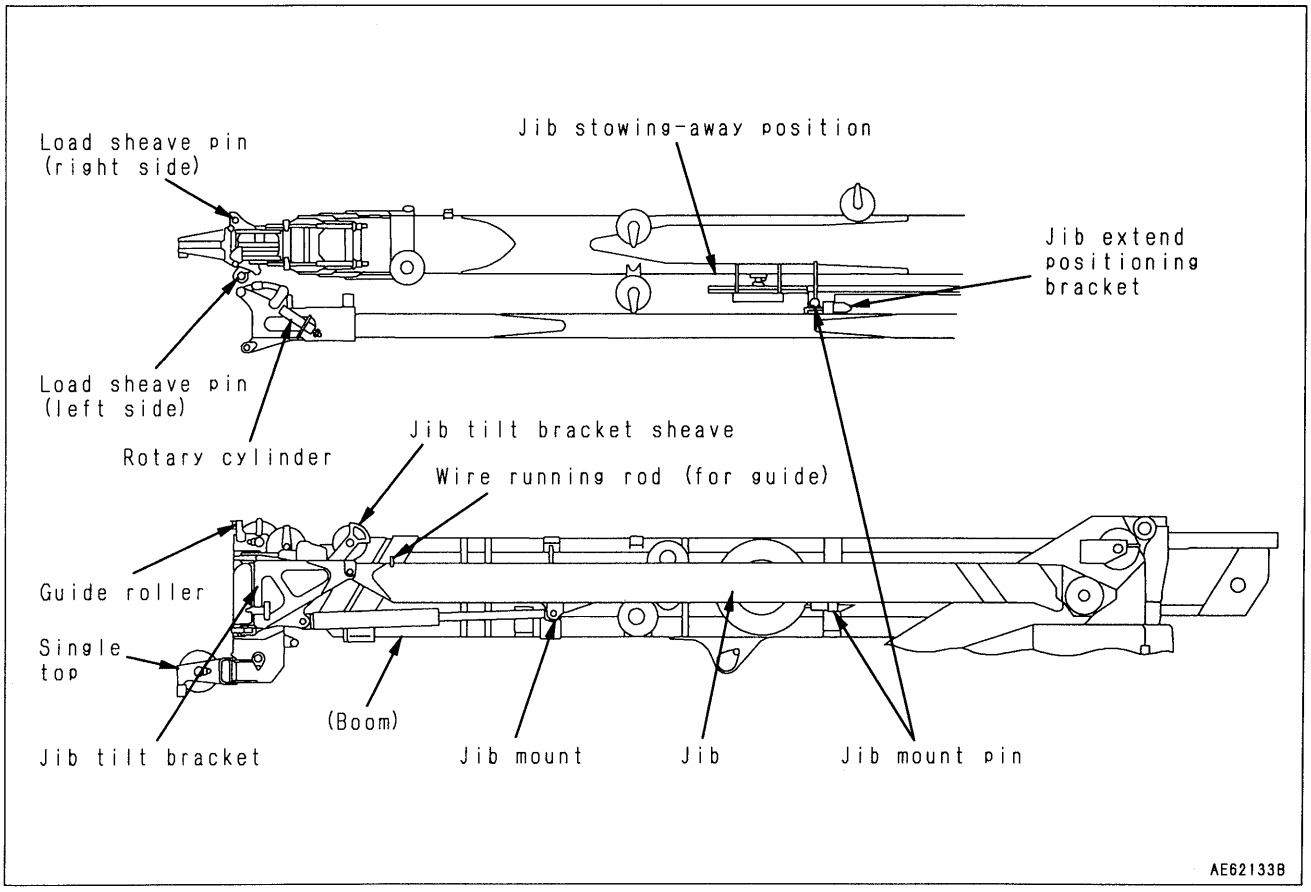
When carrying out jib operations, always follow the rated overall load table.

The following section gives procedure for installing, stowing away and tilting the jib, etc.

Order

- Names of parts needed when extending and stowing away jib 2-143
- Precautions when handling jib 2-144
- Precautions when extending and stowing away jib 2-145
- Description for the jib extending and stowing-away units 2-146
- Extending jib 2-147
- Stowing away jib 2-158
- Extending top jib 2-167
- Retracting top jib 2-168

12.32.1 NAMES OF PARTS NEEDED WHEN EXTENDING AND STOWING AWAY JIB

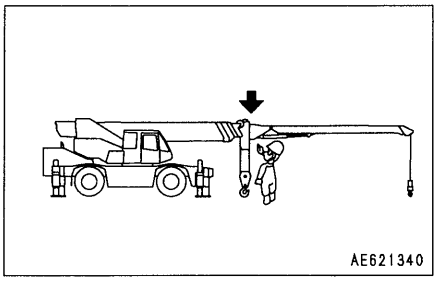


12.32.2 PRECAUTIONS WHEN HANDLING JIB

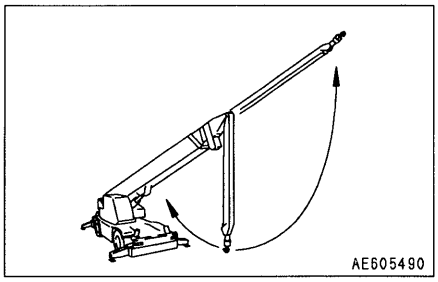
Operate the jib observing the following precautions.

⚠ CAUTION

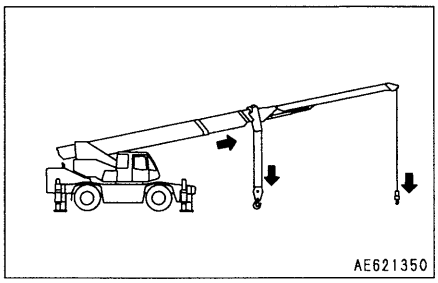
- **Check that the pins have been completely inserted or removed.**



- **Check that there is no obstacle in the range for extending the jib.**
  Make sure that there is space more than 19 m (62 ft 4 in) from the swing center forward the boom.



- **When extending the boom, be careful not to overwind the auxiliary hook and main hook.**
- **Jib operations cannot be carried out when the outriggers are not extended (on-tire operations).**
  Always set the outriggers.
- **When setting the crane, use the outriggers on the hard ground and set the crane horizontally.**



12.32.3 PRECAUTIONS WHEN EXTENDING AND STOWING AWAY JIB

Operate the jib extending and stowing-away operations observing the following precautions.

⚠ WARNING

Automatic overwinding stop is not functioned when carrying out extending and stowing-away the jib. Be careful at that time.

⚠ CAUTION

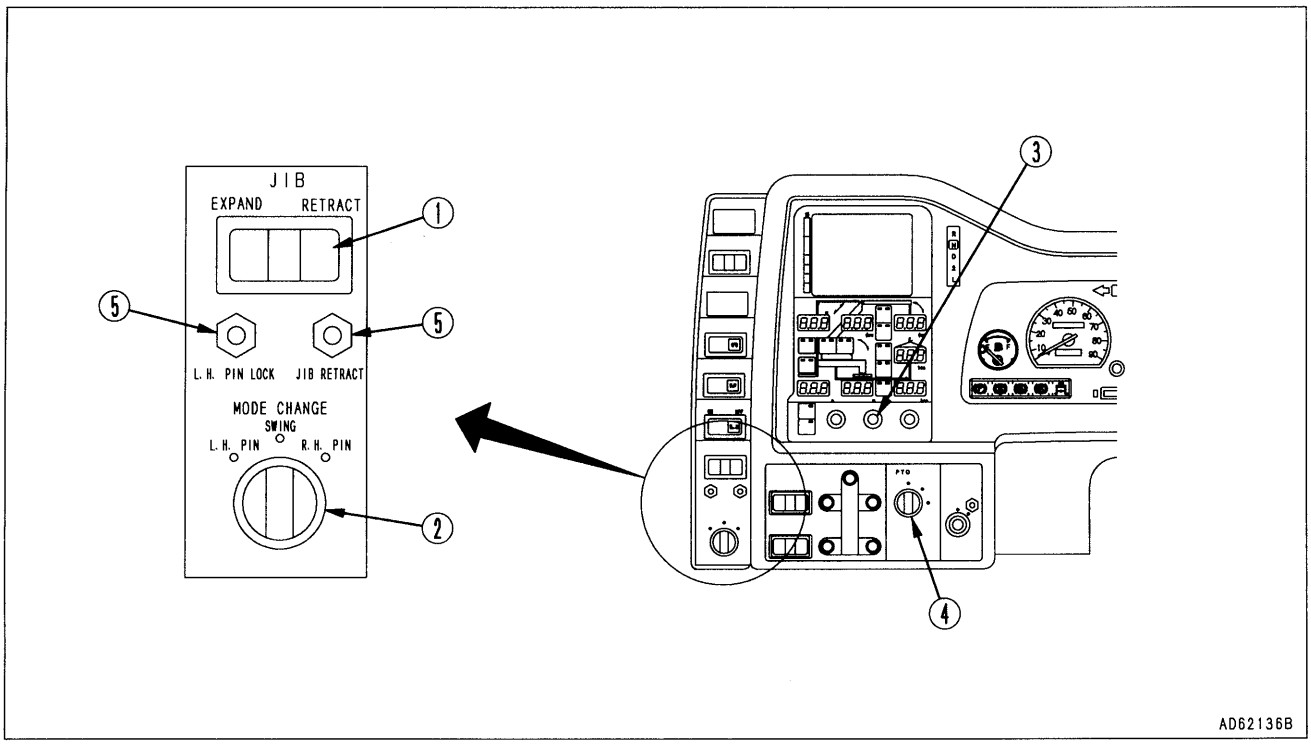
- **To prevent danger when extending and stowing-away the jib, "Automatic Stop System" is provided as follows.**
  If operation is automatically stopped, reset the operation to the normal conditions as follows and then operate the machine so as not to cause an automatic stop.

Automatic stop	Causes	Remedy
Boom raise stopped	Boom angle exceeds 30°	Lower the boom.
Boom extend stopped	Boom length exceeds 11.6 m (38 ft) and when cables (harness) for extending stowing away jib are connected to the jib side.	Retract the boom.
	"Left pin" is not inserted. "Left pin locked" lamp goes off.	Insert "Left pin" and adjust sensor.
Jib lower stopped	Boom length is shorter than 10.3 m (33 ft 9 in).	Extend boom.
Left pin removal stopped	Jib is not stowed away. "Jib stowing-away completed" lamp goes off.	Retract boom to the minimum and adjust sensor.
Jib swing stopped	Boom angle exceeds 30°.	Lower boom.
	Jib tilt angle lowers 70°.	Lower jib

- **Lighting of "Jib stowing-away completed" lamp indicates that the pin has been inserted into the jib mount, not indicating the jib stowing-away completed.**
- **While extending and stowing away the jib, if the alarm buzzer sounds, this may indicate some form of incorrect operation.**
  In this case, return to the previous step and operate again.
- **When lowering the boom, the alarm buzzer sounds near the horizontal position. This does not indicate an abnormal condition but rather informs you that the position is "Horizontal".**
- **When the sensors are required to be adjusted, consult Komatsu or your Komatsu distributor. Mis-adjustment by unqualified personnel will cause accidents.**

12.32.4 DESCRIPTION FOR JIB EXTENDING AND STOWING-AWAY UNITS

OPERATING PANEL FOR JIB EXTENDING AND STOWING-AWAY SWITCHES



① JIB SWITCH

"EXPAND" : This indicates the position to extend the cylinder selected by the mode selector switch and is used for jib extension.

"JIB" : This indicates the position to hoist the jib and cannot be used for "LEFT PIN", "SWING" and "RIGHT PIN" operation.

"RETRACT" : This indicates the position to retract the cylinder selected by the mode selector switch and is used for jib retraction.

② MODE CHANGE SWITCH

"L.H PIN" : This indicates the position to insert and draw out the jib connecting pin on the boom left side.

"SWING" : This indicates the position to rotate the jib between the front and sides of the boom.

"R.H PIN" : This indicates the position to insert and draw out the jib connecting pin on the boom right side.

③ MOMENT LIMITER (overload prevention system) crane operating mode switch

"Procedure" : This is used to extend and retract the jib.

④ PTO SELECTOR SWITCH

"WORK 1" : This is used to extend and retract the jib.

⑤ INDICATOR

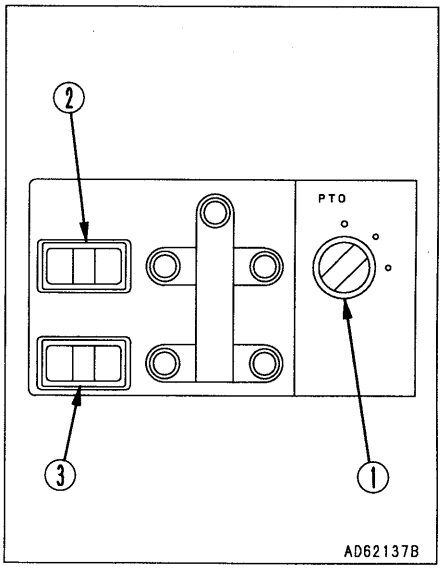
12.32.5 EXTENDING JIB

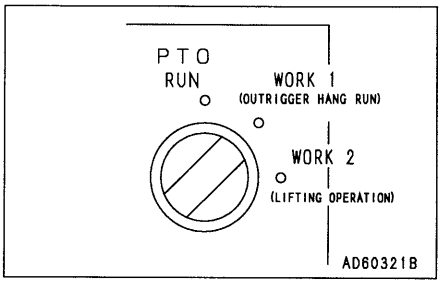
⚠ WARNING

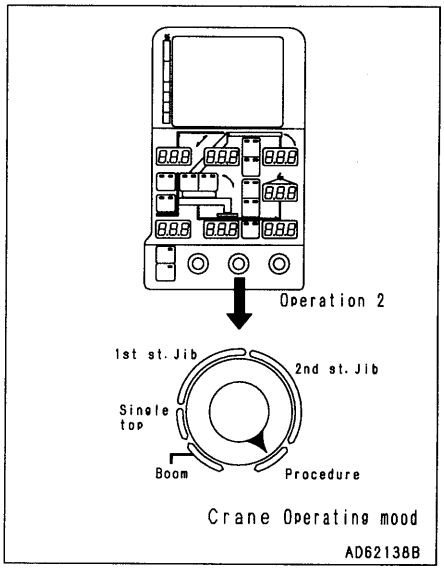
- **Extend the outriggers before extending the jib. Otherwise, it is impossible to extend jib.**
- **When extending the jib, never enter the front area or under the jib. The jib movement could cause injury.**
- **When operating the machine on a high place, always use a working bench and be careful not to fall.**
- **When climbing crane carrier or swing table , always use the specified step or a working bench.**
  Never climb upper face of outriggers to prevent danger such as slip.
- **If procedure is carried out in incorrect order when extending or retracting jib, the jib could be damaged. Always follow steps of procedure.**

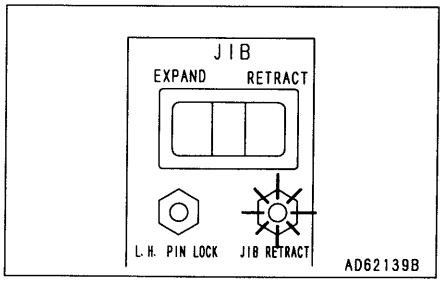
1. **Set the machine to the front leaning posture in the following procedures.**
1. Set PTO switch ① to "WORK 1".

2. Set the MOMENT LIMITER (overload prevention system) crane operating mode switch to "Procedure".
   At this time, "JIB RETRACT" indicator lamp lights up to indicate the STATUS OF STAWING JIB.

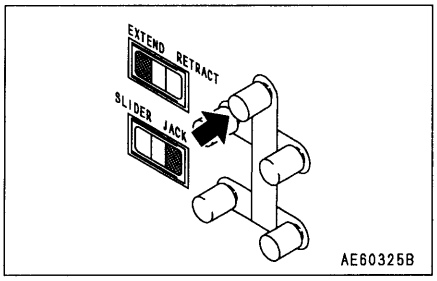






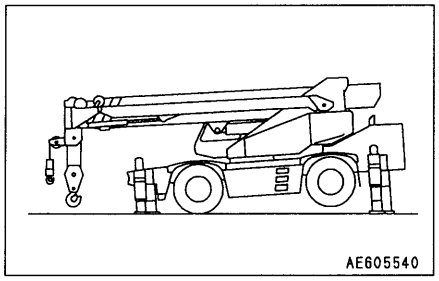


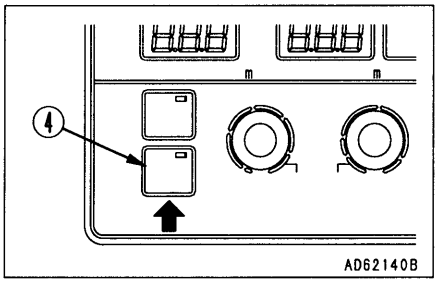
3. Operate outrigger extending/retracting selector switch ② and slider/jack selector switch ③ to extend the outriggers.
   At this time, extend the jack cylinder to the maximum.



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4. After the outriggers are extended, retract the front outrigger jack cylinder to lean the body forward just before the front wheels contact the ground.
   At this time, press setting switch ④ and re-set the extending width of the outriggers.

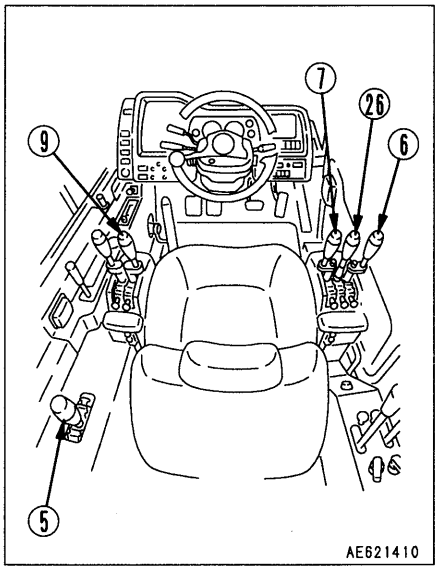

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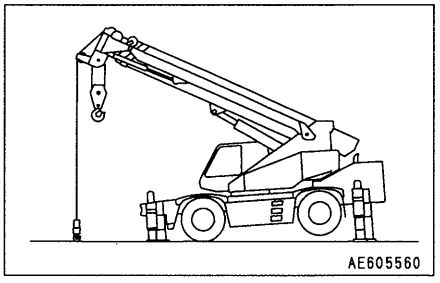
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2. Lower the auxiliary hook on the ground in the following procedures.

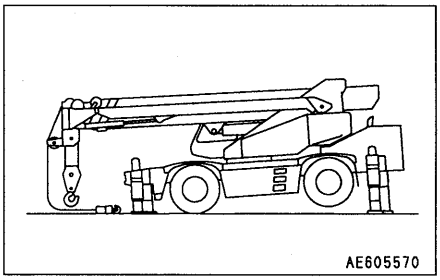
1. Operate boom telescope lever ⑤ to retract the boom completely,
2. Operate boom hoist lever ⑥ to raise the boom up to approx "23°".
3. Operate auxiliary winch lever ⑦ to lower the auxiliary hook on the ground.
   This operation is preparation for running the wire to the jib.



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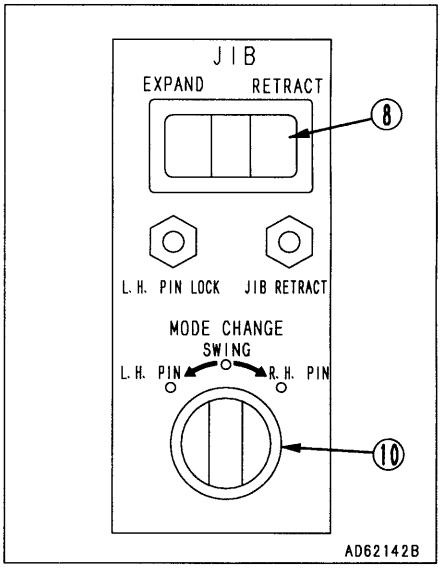

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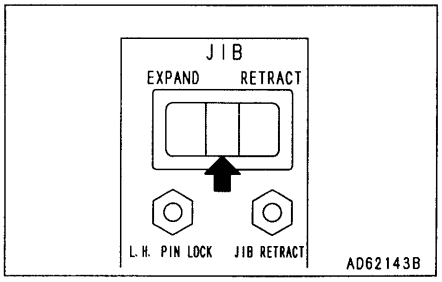
4. With this state, operate the hoist lever to lower the boom fully.



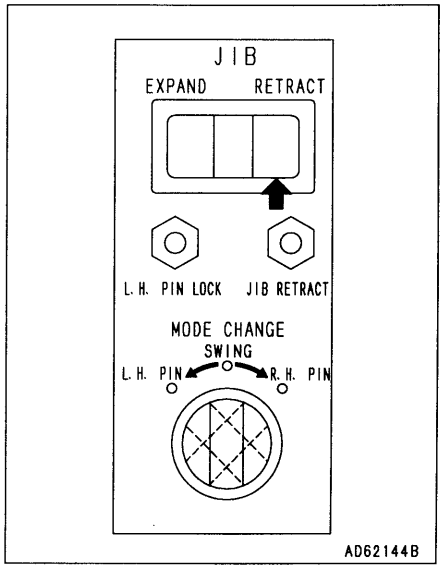
3. Retract the cylinders of the jib to the minimum in the following procedures.

1. Set jib switch ⑧ to "JIB" and pull power tilt lever ⑨.
   The jib floats.
   This operation prevent the cylinder lock pin from interfering with the bracket when extending the jib.
   The reason is that when the jib is not used for a long time, each cylinder of the jib may be a little hydraulically dropped.





2. Set jib switch ⑧ to "RETRACT" (the lamp inside the switch lights up) and set jib mode change switch ⑩ to "L.H PIN" or "R.H PIN".
   - Pull the power tilt lever at "L.H PIN" to retract the left pin.
   - Pull the power tilt lever at "R.H PIN" to retract the right pin.

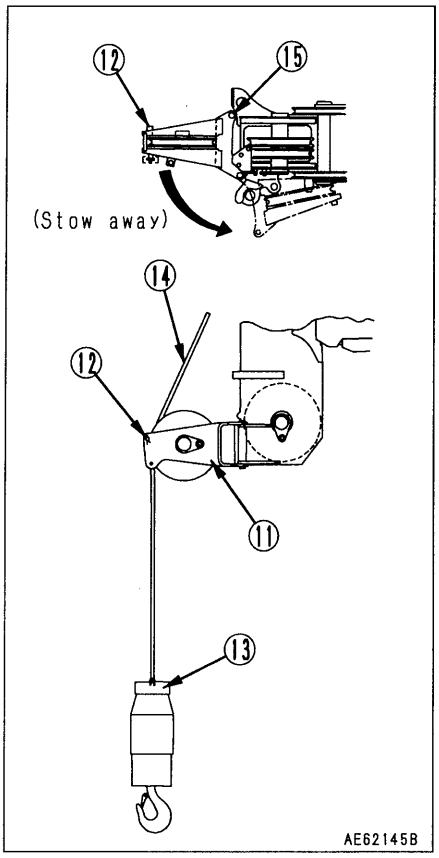


4. Stow away the single top in the following procedures.

⚠ CAUTION

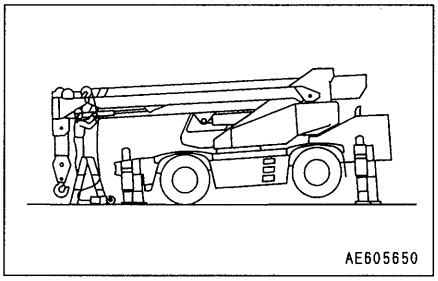
If the jib s extended while extending the single top (while rotating), the jib tilt cylinder will strike the single top to cause damage.

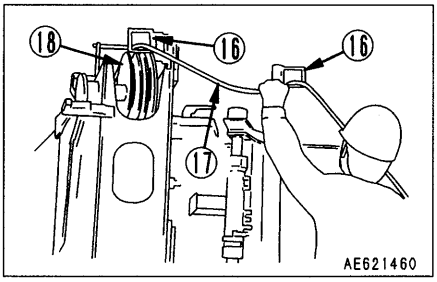
1. Remove load sheave pin ⑫ on single top ⑪.
2. Remove the wire rope of overwinding detection weight ⑬ from the single top.
3. Remove rope ⑭ from the single top.
   After removing, install load sheave pin ⑫ to the original position.
4. Remove lock pin ⑮ from the single top and stow the single top away.
   After then, lock the jib with the removed pin.
5. Place the auxiliary rope in the following procedures.

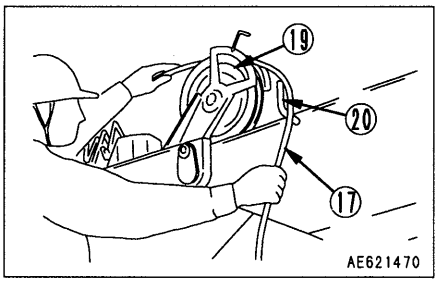


5. Place the auxiliary rope in the following procedures.

1. Place the auxiliary rope on the side face of the jib through guide roller ⑯.
2. Fit auxiliary rope ⑰ on the sheave ⑲ located on the upper face of the jib tilt bracket through the two guide rollers from boom idler sheave ⑱, and place on guide bar ⑳ of the jib side face.
3. Pull the exchanged rope to lose the slackening.

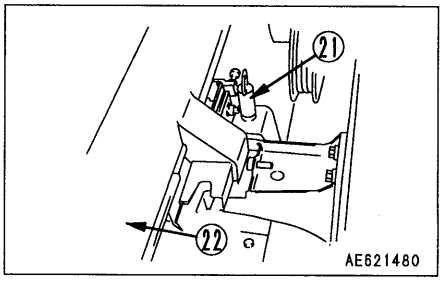


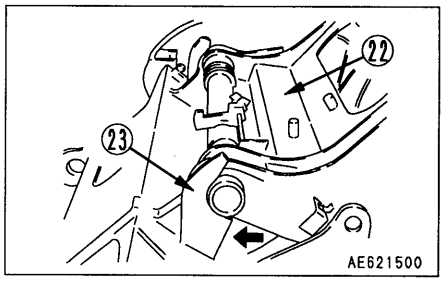




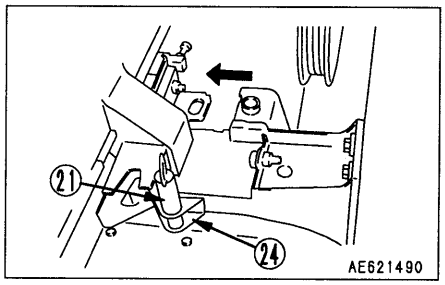
6. Extending jib in the following procedures.

1. Remove jib stowing pin ㉑ and extend jib ㉒ until the other end of the jig contacts with plate for preventing the jig from dropping ㉓, then align the left pin with the hole on the boom.



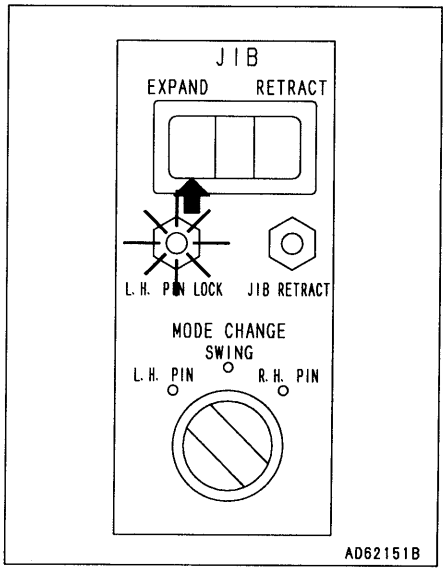


2. Place the removed pin ㉑ on positioning bracket ㉔.

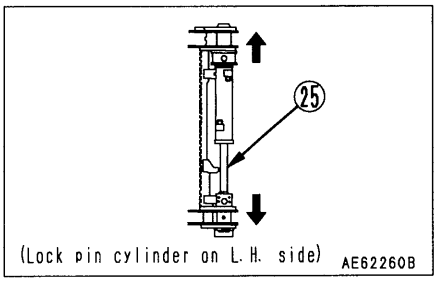


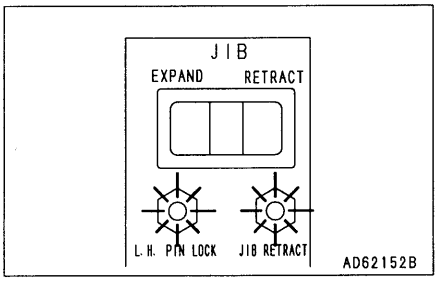
7. Connect the jib left pin to the boom in the following procedures.

1. Set jib switch ⑧ to "EXPAND" and set mode selector switch ⑩ to "L.H PIN".



2. When power tilt lever ⑨ is removed, left pin lock cylinder ㉕ extends to connect the left pin to the boom and indicator lamp "L.H PIN LOCK" lights up.





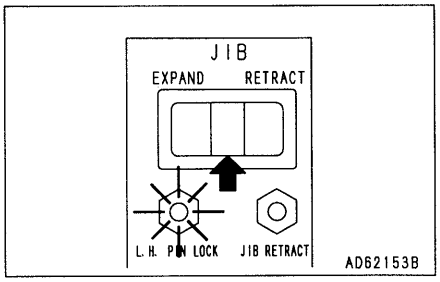
8. **Raise the boom to approximate 10° and extend the boom to 10.8 m (35 ft 5 in) in the following procedures.**

⚠ WARNING

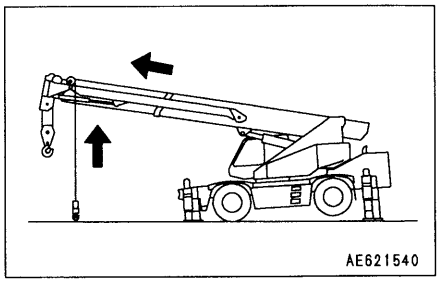
- **When extending the boom, the overload automatic stop can not function. Always take care of the main hook location not to strike the boom tip.**
- **If extending the boom without the left pin inserted, the jib falls down.**
  (If indicator lamp "L.H PIN LOCK" is turned off, boom extending operation stops automatically.)

1. Set jib switch ⑧ to "JIB".

2. Operate boom hoist lever ⑥ to raise the boom to approximate 10°. At this time, make sure that indicator lamp "L.H PIN LOCK" lights up.



3. Operate main winch lever ㉖ and boom telescope lever ⑤, and extend the boom to approximate 10.8 m (35 ft 5 in) while lowering the main hook and auxiliary hook.
   When the boom is extended, "JIB RETRACT" indicator lamp goes off.

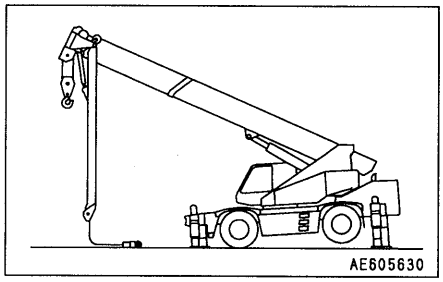


9. Derrick the jib vertically while raising the boomin the following procedures.

⚠ WARNING

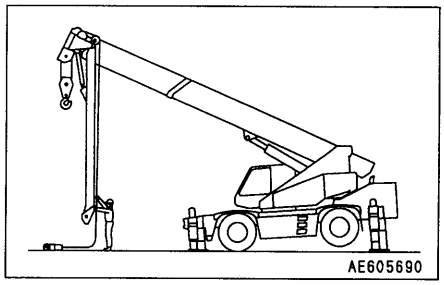
When lowering the jib, make sure that there are no workers within the working area.
Be careful not to let the jib strike the machine body.

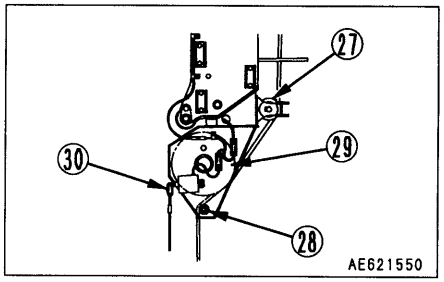
1. Lower the jib so as not to touch the machine body while raising the boom.
2. When the jib becomes vertical while keeping the boom raising angle of approximate 24°, lay the auxiliary hook on the ground.
3. Lower the boom to lower the jib tip close to the ground.


AE605630

10. Pass the auxiliary wire rope through the jib tip sheave in the following procedures.

1. Pass the auxiliary wire rope through the jib idler sheave ㉗. Remove rope lock pin ㉘. Pass through the jib tip sheave ㉙. Then, install the lock pin ㉘.
2. Install the wire rope ㉚ of the overwind weight onto the overwind switch and jib.

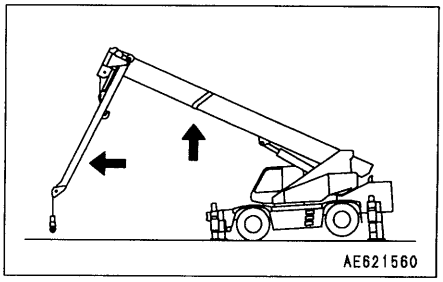

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11. Lower the jib fully in the following procedures.

1. Operate the boom-hoist lever to float the auxiliary hook from the ground.
   - Do not wind-in the auxiliary hook using the winch, because it may be wound-in wildly.
2. Lower the jib fully (Retract the jib tilt cylinder to the stroke end.)


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12. Swing the jib to touch the stopper in the following procedures.

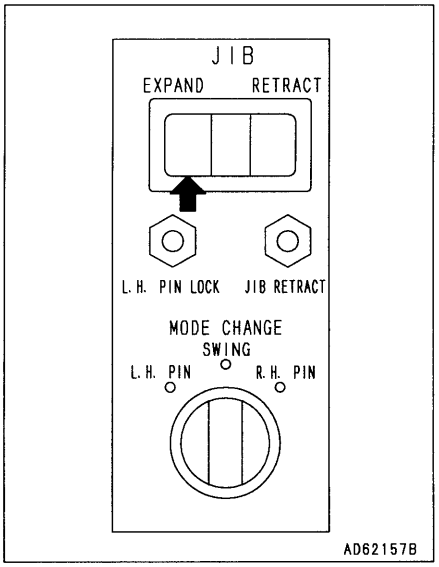
⚠ WARNING

When swinging the jib, make sure that there are no workers and no obstacles within working area.
Be careful of the jib so as not to sway the auxiliary hook when swinging the jib.

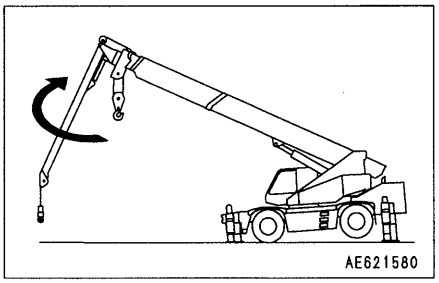
⚠ CAUTION

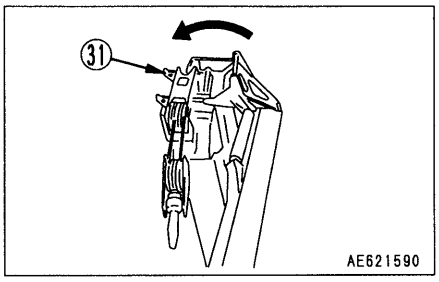
- **If the jib is swung while it is not lowered, unexpected force is applied on the jib foot and may cause deformation or damage.**
  (Jib swing operation stops automatically if jib lowering angle lowers 70°.)
- **If the jib is swung while keeping the boom not less than 30°, unexpcted force is applied on the rotating ring and may cause deformation or damage.**
  ("Jib raising operation" and "Jib rotating operation" stop automatically if the jib angle exceeds 30°.)

1. Set jib switch ⑧ to "EXPAND".
2. Set mode selector switch ⑩ to "SWING".
3. Wind-up the auxiliary hook near to the jib tip. This operation is for preventing the hook from dropping, because the wire is loosened when swinging.
4. After operating the switch, when power tilt lever ⑨ is pulled, the jib moves to the front of the boom tip.
   Continue boom swing operation until the boom touches the stopper ㉛.



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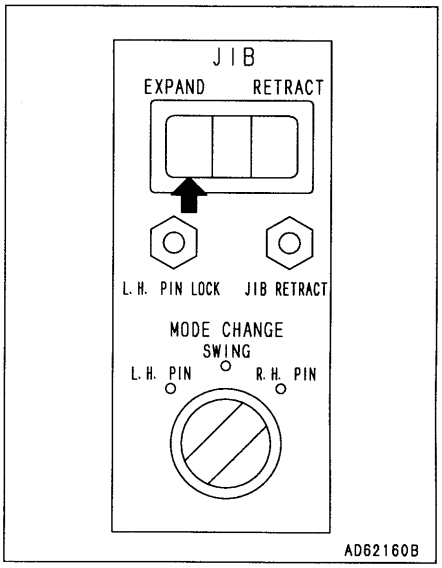
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13. Connect the right pin lock cylinder to the boom in the following procedures.

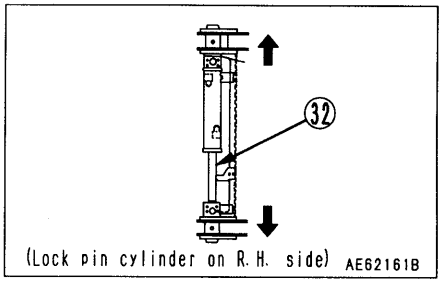
⚠ WARNING

Always make sure visually that the right pin lock cylinder extended fully until it connected with the boom.

1. Set mode selector switch ⑩ to "R.H PIN".

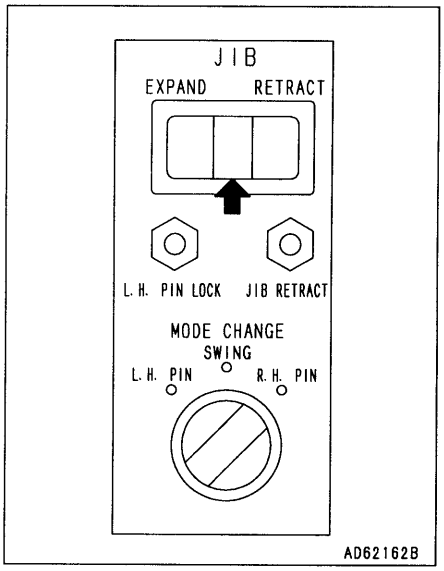


2. When pulling power tilt lever ⑨, right pin lock cylinder ㉜ is extended and the right pin is connected with the boom.

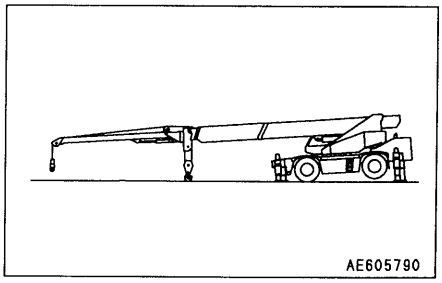


14. Lower the boom fully while raising the boom in the following procedures.

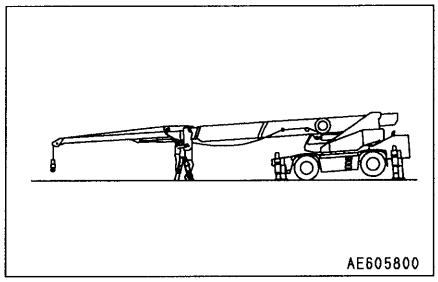
1. Set jib switch ⑧ to "JIB".

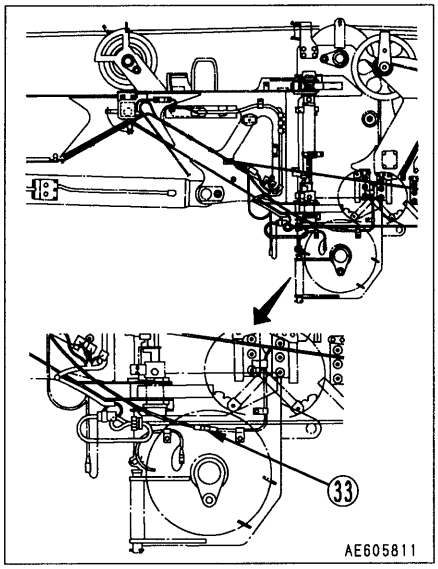


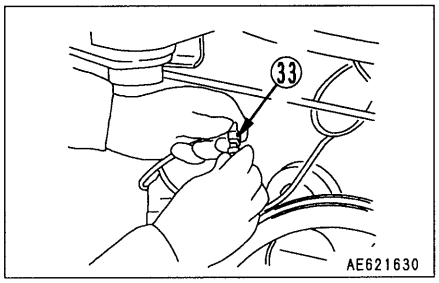
2. Operate the power tilt lever and boom hoist lever to lower the boom while raising the jib.



15. Remove overwind harness ㉝ from the single top and connect the harness to the jib.



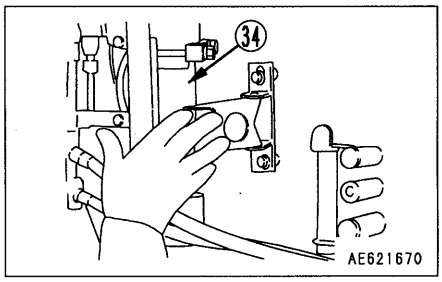


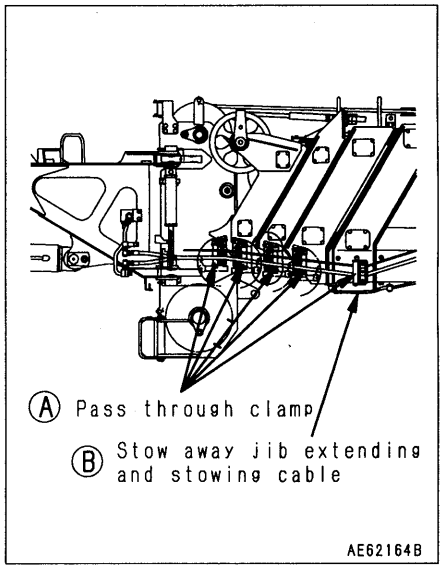


16. Install retract lock plates ㉞ on the left and right hand pin lock cylinders.

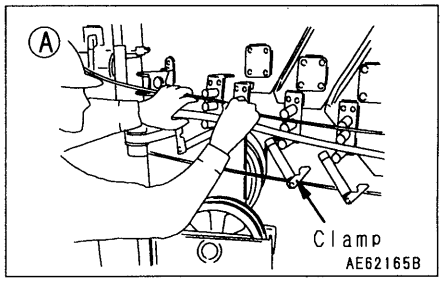
⚠ WARNING

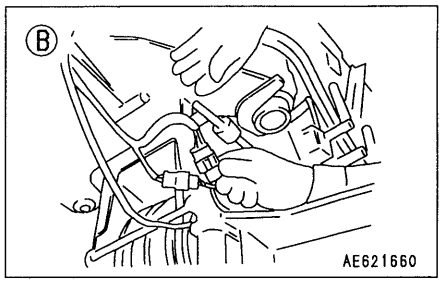
Always install the lock plates on the both sides to prevent the pins from falling off due to fault retraction of the lock cylinder during jib operation.





17. Pass the hoses and cables between the boom and the jib through the clamps (see Ⓐ).
Remove the jib extending/stowing cables and connect them to the boom side (see Ⓑ).
(Never forget to cap the connectors.)





In the above procedures, the operation for extending the jib is completed.

12.32.6 STOWING AWAY JIB

⚠ WARNING

- **When extending the jib, never enter the front area or under the jib. The jib movement could cause injury.**
- **When operating the machine on a high place, always use a working bench and be careful not to let it fall down.**
- **When climbing the crane carrier or swing table , always use the specified step or a working bench.**
  Never climb the upper face of the outriggers to prevent danger such as slips.

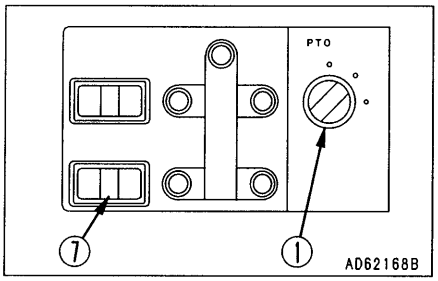
1. **Set the PTO switch, overload prevention system and jib switch in the following procedures.**
1. Set PTO switch ① to "WORK 1".

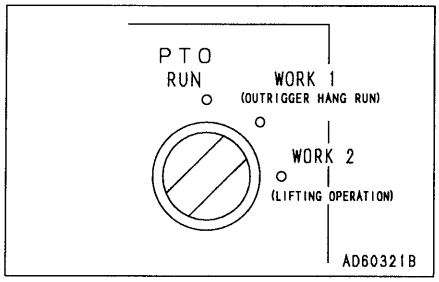
2. Retract the jib to the 1st stage.

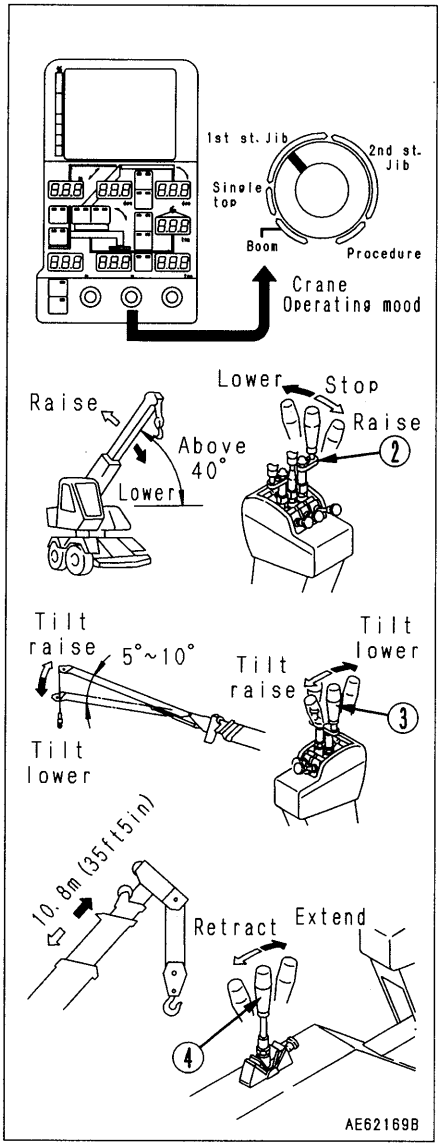
3. Set the moment limiter (overload prevention system) crane operating mode switch to "1st st. jib".

4. Set the boom angle to more than 40° by using boom lowering lever ②, and set the jib angle 5° – 10° by using power tilt lever ③.

5. Retract the boom to approximate 10.8 m (35 ft 5 in) by using boom telescopic lever ④.



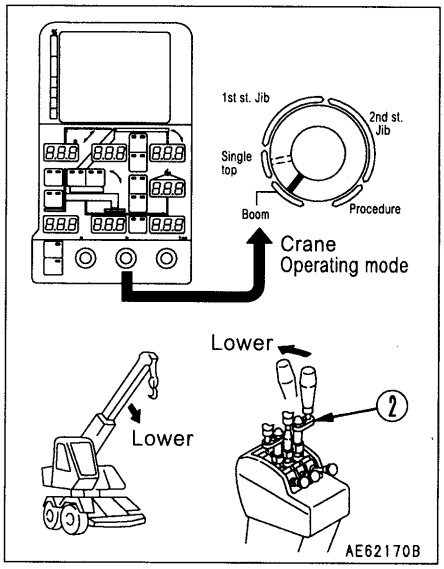




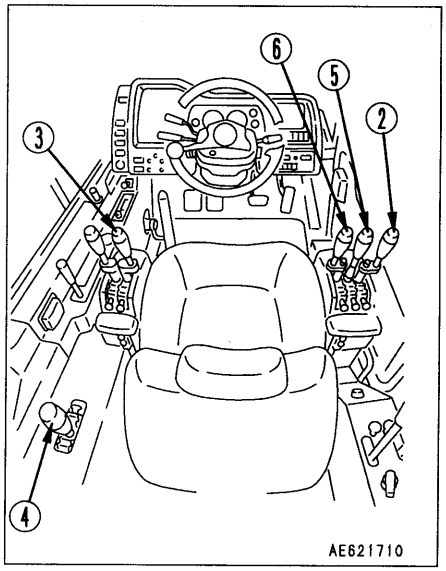
6. Set the moment limiter (overload prevention system) crane operating mode switch to "Boom" or "Single top".

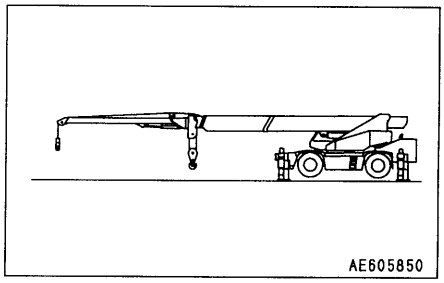
7. Lower the boom to the maximum by using boom lowering lever ②.

8. Set the moment limiter (overload prevention system) crane operating mode switch to "Procedure".
   At this time, the alarm buzzer sounds for 2 – 3 seconds. This checks that the mode is in "Procedure".

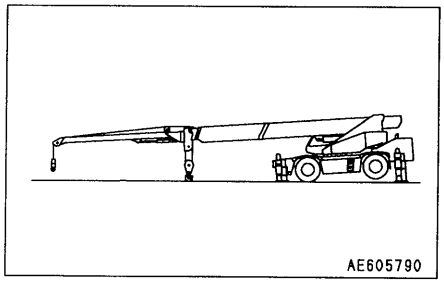


9. While hoisting the main and auxiliary hooks by operating the main and auxiliary winch levers ⑤ and ⑥, operate the boom hoist lever to lower the boom fully.

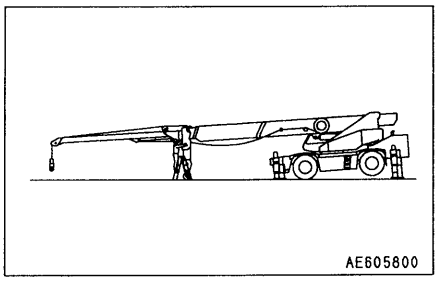


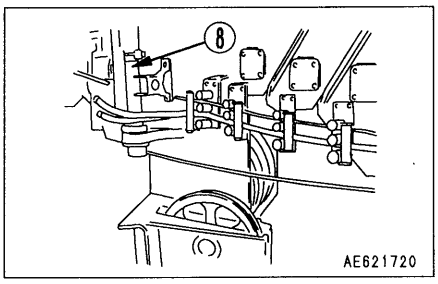


2. **Make the machine front leaning posture.**
   Operate outrigger slider/jack selector switch ⑦ and related switches to retract the front outrigger and jack cylinder, to lean the body forward just before front wheels contact the ground.

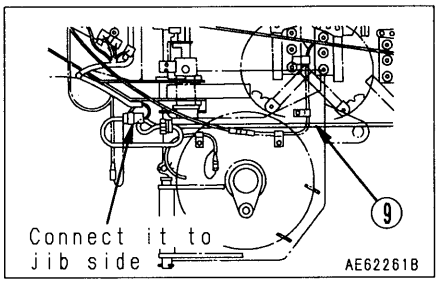


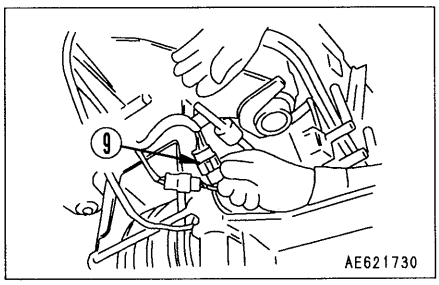
3. **Remove retract lock plate ⑧ located on the left and right pin lock cylinders.**

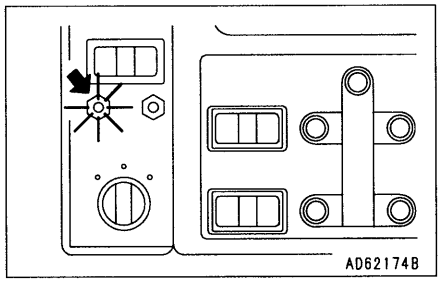




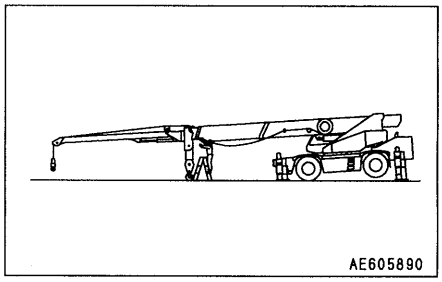
4. **Remove the jib extending/stowing cables ⑨ from the jib and connect them to the jib side. At this time, make sure that the "L.H. PIN LOCK" indicator lamp lights up.**

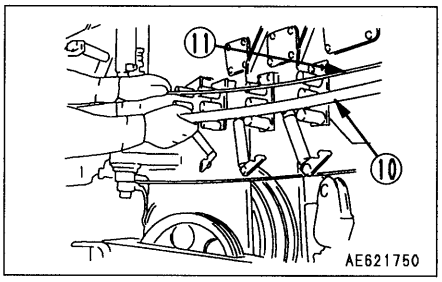




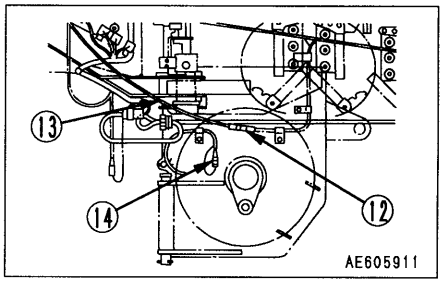


5. **Remove the hoses ⑩ and cables ⑪ connected between the boom and jib from the clamps.**

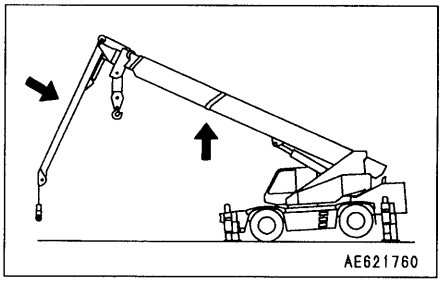




6. **Remove overwind harness ⑫ from jib ⑬ and connect the harness to single top ⑭.**



7. **Raise the boom to approximate 23° and extend the jib fully in the following procedures.**



⚠ WARNING

Lower the auxiliary hook to a position where its top end is 1 m (3 ft 3 in) from the jib bracket tip.
Otherwise, the auxiliary hook will be wound while swinging the jib, and jib can be damaged.

1. Operate boom hoist lever ⑭ to raise the boom to approximate 23°.
   At this time, make sure that the jib switch is set to "JIB".

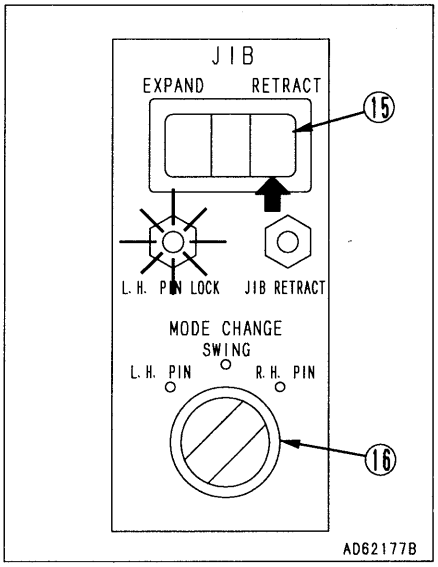
2. Operate power tilt lever ⑮ to lower the jib completely.
   At this time, lower the auxiliary hook to a position where its tip is 1 m (3ft 3 in) far from the jib bracket tip.

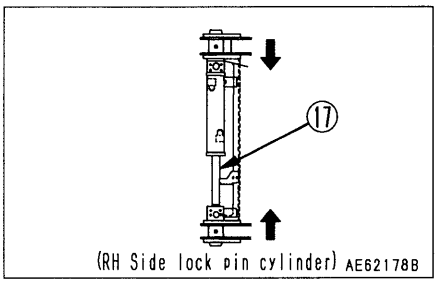
8. Remove the right pin lock cylinder from the boom.

⚠ WARNING

Make sure visually that the right pin lock cylinder pin has been removed.

1. Set jib switch ⑮ to the "RETRACT" position.
2. Set mode selector switch ⑯ to the "R.H PIN" position.
3. After switch setting is completed, when power tilt lever ③ is pulled, the pin of right pin lock cylinder ⑰ is removed.





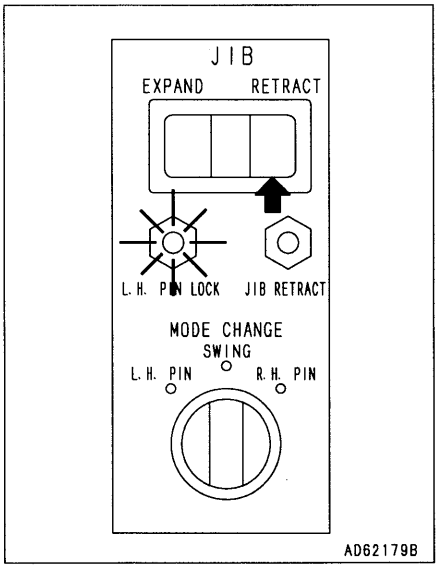
9. Swing the jib.

⚠ WARNING

Make sure that there are no workers and obstacles in the jib operation area.
Be careful of swaying of the auxiliary hook when swinging the jib.

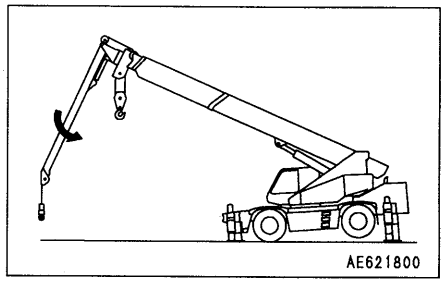
⚠ CAUTION

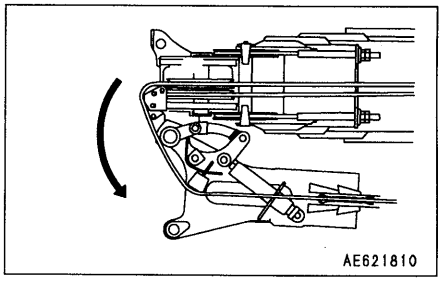
- **If the jib is swung while it is not lowered, unexpected force is applied on the jib foot and may cause deformation or damage.**
  (Jib swing operation stops automatically if jib lowering angle lowers 70°.)
- **If the jib is swung while keeping the boom not less than 30°, unexpcted force is applied on the rotating ring and may cause deformation or damage.**
  ("Jib raising operation" and "Jib swing operation" will stop automatically if the jib angle exceeds 30°.)



1. Make sure that jib switch ⑮ is set to the "RETRACT" position.
2. Set mode selector switch ⑯ to the "SWING" position.

3. After setting the switches, when power tilt lever ③ is pulled, the jib swings to the rear of the boom tip.





10. Raise the jib tip vertically in the following procedures.

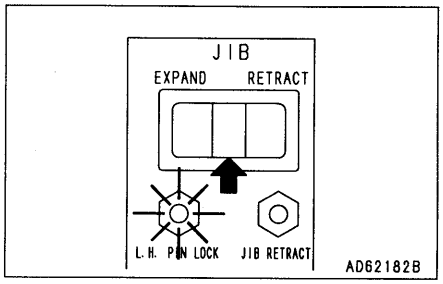
⚠ WARNING

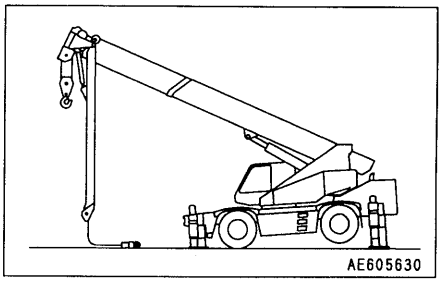
Before raising the jib, make sure that there are no workers in the operation area.

1. Set jib switch ⑮ to "JIB" position.

2. Raise the jib vertically using power tilt lever ②.
   When the jib is vertical, lay the auxiliary hook on the ground.

3. Lower the boom so that the jib tip becomes close to the ground.



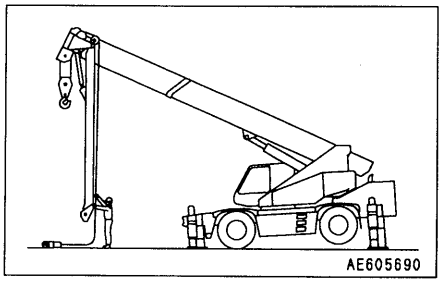


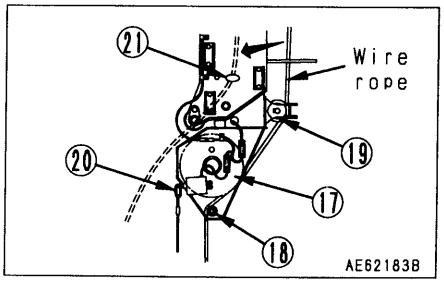
11. Remove the auxiliary rope from jib tip sheave ⑰ in the following procedures.

1. Remove the rope lock pin ⑱ from the jib tip and remove the auxiliary rope from jib tip sheave ⑰ and jib idler sheave ⑲.
   Fit the rope lock pin again on the previous position.

2. Remove wire rope ⑳ of the overwind weight from the overwind switch and jib.

3. Put the removed wire on wire receiver ㉑.

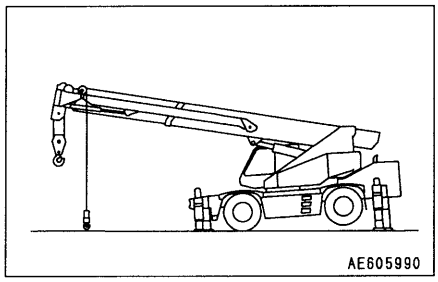




12. Raise the jib completely in the following procedures.

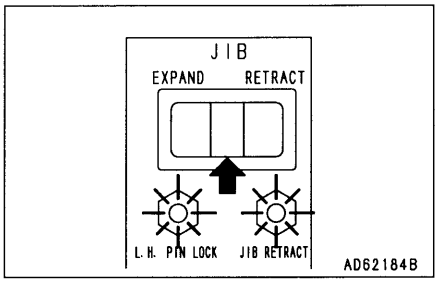
⚠ CAUTION

Unless the jib is raised completely, the jib and jib mount will be damaged when stowing away the jib.

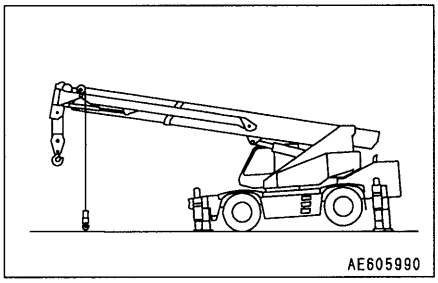


1. Operate the boom hoist lever to raise the boom angle to approximate 23°.
   At this time, make sure that the jib switch is set to the "JIB".
2. Raise the jib completely by operating power tilt lever ③.

13. After stowing away the jib, then lower the boom in the following procedures.



1. Operate auxiliary winch lever ⑤ and boom telescope lever ④ and retract the boom completely while winding-in the auxiliary hook.
   At this time, take care that the hook does not interfere with the chassis.
2. Make sure that the jib is stowed away and the indicator lamp "JIB RETRACT" lights up.
3. Lower boom using boom hoist lever ②. When the boom angle becomes approximate 10°, drop the auxiliary hook on the ground. This operation makes simplify to run the auxiliary rope.
   In addition, make sure the condition of the auxiliary hook by the front under-mirror.



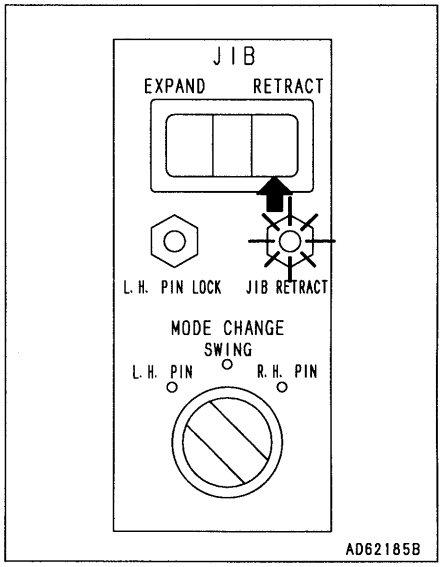
4. After dropping the hook, lower again the boom completely.

14. Remove the jib left pin from the boom in the following procedure.

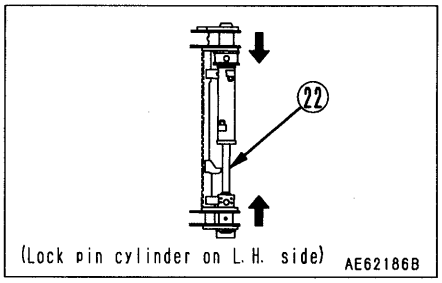
⚠ WARNING

If the left pin is removed when the jib is not mounted on the boom, the jib will drop.
(When indicator lamp "JIB RETRACT" is turned off, removal of the left pin stops automatically.)

1. Set jib switch ⑮ to the "RETRACT" position. Set mode selector switch ⑯ to the "L.H PIN" position.



2. When power tilt lever ③ is pulled, left pin lock cylinder ㉒ is retracted and the left pin is released from the boom.
Make sure that indicator lamp "JIB RETRACT" lights up.
At this time, make sure that the "Left pin lock completed" indicator lamp lights up.



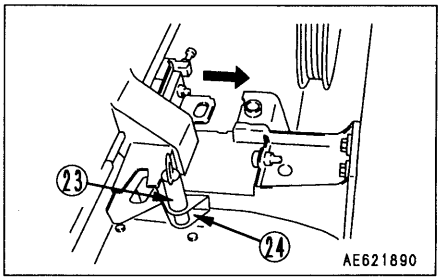
15. Push the jib toward the boom side and insert the jib stow-away pin securely into the specified position in the following procedures.

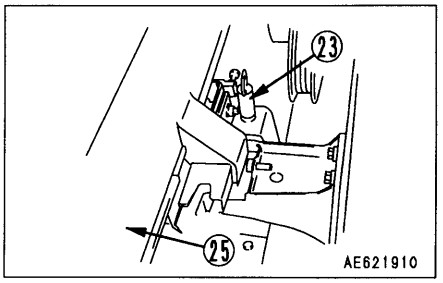
⚠ WARNING

Unless the jib stow-away pin is inserted, the jib will fall when traveling the machine or when operating the crane.

1. Remove jib stow-away pin ㉓ from jib positioning bracket ㉔. Push jib ㉕ toward the boom and insert the jib stow-away pin securely into the specified position.

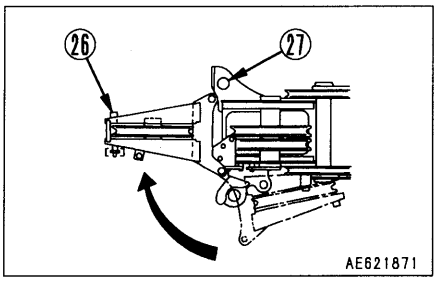
2. Then, lock the jib stow-away pin with the lynch pin.





16. Extend single top ㉖.

Remove lock pin ㉗ from stowed-away sigle top ㉖. Extend the sigle top and lock it using removed lock pin ㉗.

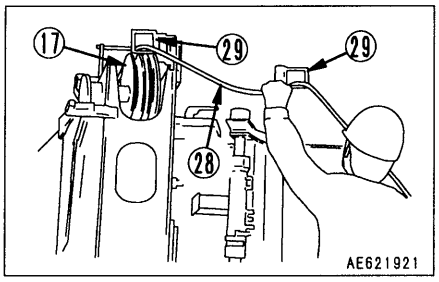


17. Fit the auxiliary rope on the sigle top and install the overwind weight.

⚠ CAUTION

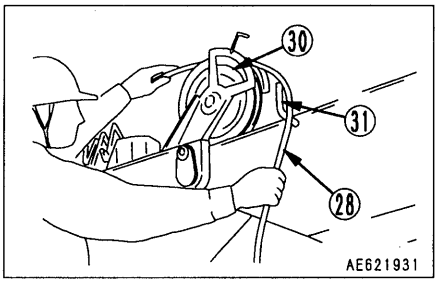
Remove the rope from the guide roller in the front of the idler sheave located on the top boom. Otherwise, the guide roller will be damaged.

1. Remove auxiliary rope ㉘ from guide roller ㉙ in the front of the idler sheave ⑰ located on the top boom and from the guide roller ㉙, ㉚ and ㉛ on the upper face of the jib tilt bracket.



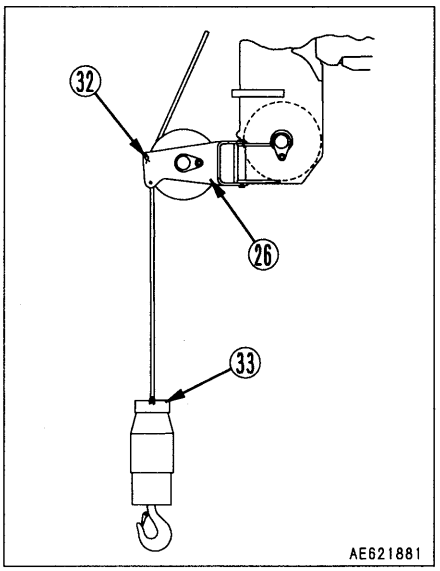
2. Remove rope lock pin ㉜ on single top ㉖. Fit the rope on the sheave of the single top and install the lock pin ㉜.

3. Connect the wire for overwind detection weight ㉝ with the single top.



In the above procedures, the operation for stowing-away is completed.

Return the MOMENT LIMITER (overload prevention system) crane operating mode switch to "Boom" or "Single top".



18. To correct the looseness of the auxiliary rope, wind the rope after raising the auxiliary hook by extending and raising the boom using operation of the boom hoist lever and telescoping lever.

12.32.7 EXTENDING TOP JIB

⚠ WARNING

- **Never stand in the front of jib when extending the jib. Unexpected jib movement can cause an accident.**
- **When operating the machine on a high place, always use a working bench and be careful not to let it fall down.**
- **Always lock the top jib lock pin using the attached pin.**

1. Carry out the following preparations.

1. Retract the boom fully and lower the boom to a point just before the tip of the jib contacts the ground.
   This can be done also by retracting the jack cylinder. In this case, it is necessary to re-set the extension width of the outriggers.

2. Set the overwind detection weight on top of the auxiliary hook, then wind in the auxiliary winch rope until it contacts the tip of the jib.

REMARK

When doing this, put the overwind detection weight on the top of the auxiliary hook.

3. Remove the connector of the overwind detection limit switch at the tip of the jib.

2. Pull out the top jib in the following procedures.

⚠ WARNING

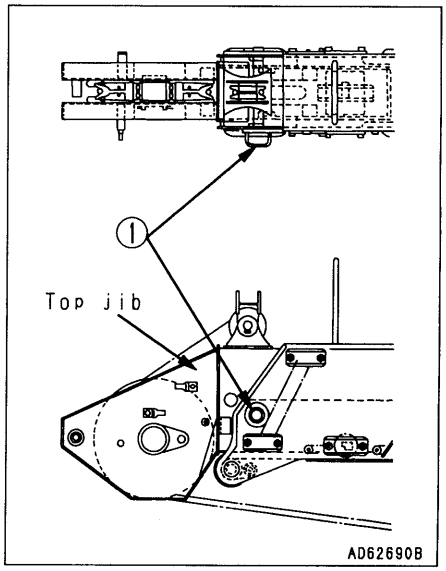
Top jib could be extended quickly. Never stand in direction of jib extending.

1. Remove the top jib stopper pin ①.

2. When the auxiliary winch rope is loosened, the top jib comes out.

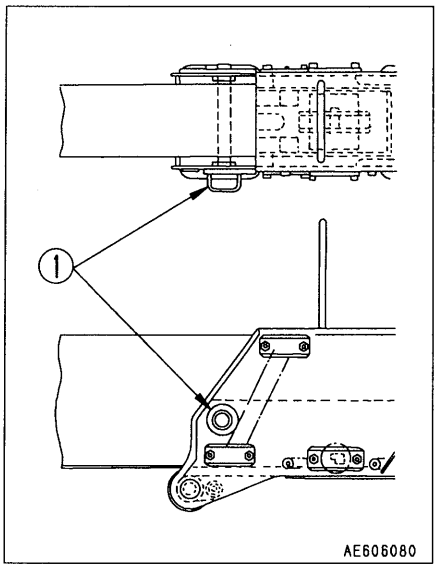
REMARK

Raise the jib while loosening the auxiliary winch rope, taking care not to let the tip of the jib touch the ground.
If it does not come out by itself, loosen the auxiliary winch rope and pull it out by hand.



3. Insert top jib stopper pin ①.

4. Connect the connector of the overwind detection limit switch.



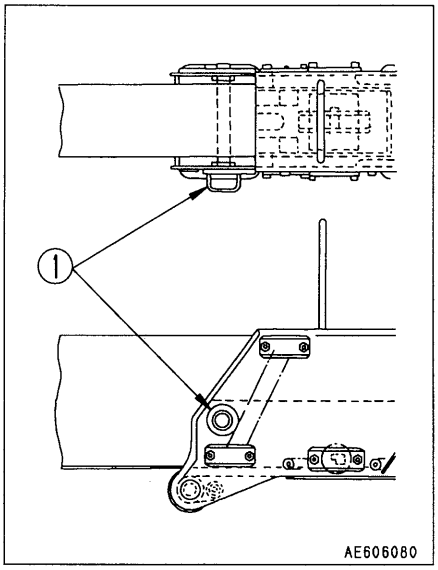
12.32.8 RETRACTING TOP JIB

1. Carry out the following preparations.

1. Retract the boom fully and lower the boom to a point just before the tip of the jib contacts the ground.
   This can be done also by retracting the jack cylinder. In this case, it is necessary to re-set the extention width of the outriggers.

2. Set the overwind detection weight on top of the auxiliary hook, then wind in the auxiliary winch rope until it contacts the tip of the jib.

3 Remove the connector of the overwind detection limit switch at the tip of the top jib connection.



2. Pull out the top jib in the following procedures.

1. Remove the top jib stopper pin ①.

2. When the auxiliary winch rope is wound in, the top jib is stowed away.

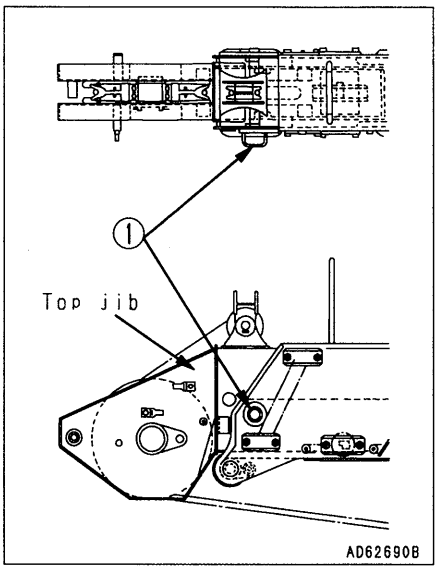
REMARK

When winding in the auxiliary winch rope, carry out the operation slowly.

Lower the boom gradually so that the tip of the jib moves horizontally.

3. Insert the top jib stopper pin ①.

4. Connect the connctor of the overwind detection limit switch.



12.33 HANDLING SINGLE TOP

⚠ WARNING

Always follow the rated overall load table when carrying out single top operations.

Use the single top to carry out efficient operations, etc. where the main boom is raising a light load and the lifting speed is fast.

12.33.1 EXTENDING SINGLE TOP

⚠ WARNING

Be careful when removing the stowing pin. Depending on the boom angle, the single top may extend under its own weight. Always install the stopper pin.

1. Set main winch clutch lever ① to the "ON" position and apply the lock.
   Lock main winch lever ②.

2. Depress the auxiliary winch brake pedal. Set auxiliary winch clutch lever ③ to the "OFF" position and release the auxiliary winch brake pedal.

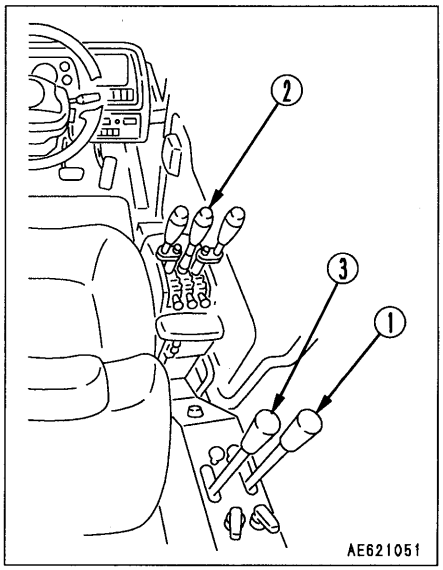
3. Remove the stopper pin stowed on the side of the boom, then remove stowing pin ④.

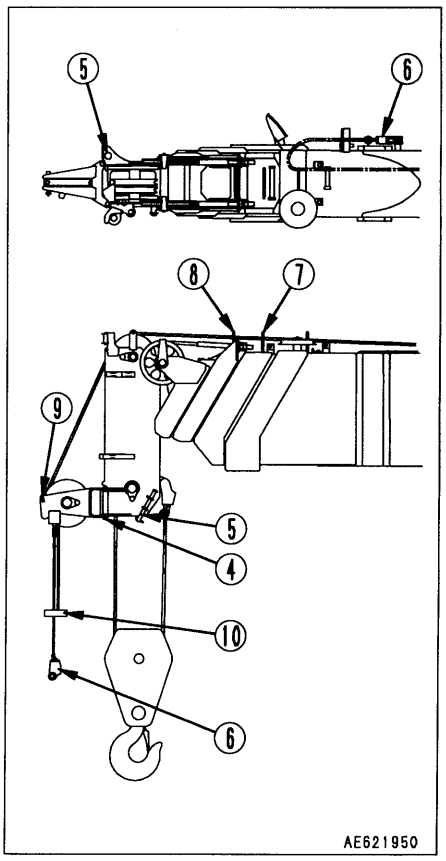
4. Rotate the single top to the front so that the bosses for the boom and single top are aligned, then insert stowing pin ⑤ and install the stopper pin.

5. Remove socket ⑥ of the auxiliary winch wire rope.

6. Pass socket ⑥ through roller guides ⑦ and ⑧ of the 2nd and 3rd section booms respectively and pass the wire rope through the auxiliary winch sheave (right side) of the top boom.

7. Remove single top rope guide pin ⑨, pass the wire through, then insert pin ⑨, and then insert the stopper beta pin.





8. Hang overwind detection weight ⑩ from the single top.

9. Set the switch to the "SINGLE TOP" position. For details, see "12.35 SETTING MOMENT LIMITER (overload prevention system).

10. Set the auxiliary winch clutch lever to the "OFF" position, pull out the wire while raising the boom, then swing the boom to bring it to the auxiliary hook over the front chassis, and install socket ⑥ to the auxiliary hook.

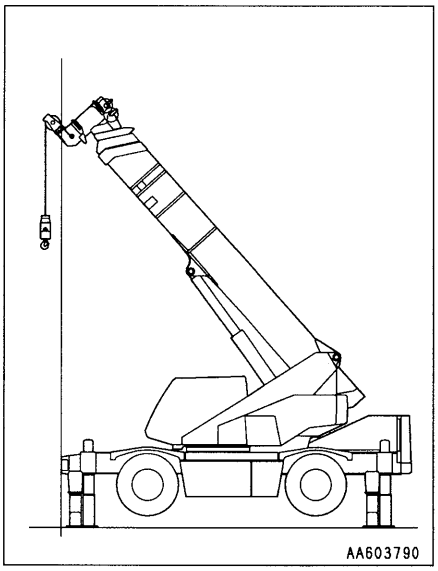
11. Set the auxiliary winch clutch lever to the "ON" position, wind in the winch, and take out the auxiliary hook.

⚠ WARNING

When pulling out the wire rope, set the auxiliary winch clutch lever to the "OFF" position, and pull the rope.
If the auxiliary winch lever is set to "WIND OUT" position and the wire is pulled out, the wire rope on the inside of the drum will become loose and the wire rope will not lie properly, so do not use the auxiliary winch lever.

REMARK

When taking out the auxiliary hook, set the angle of the boom so that the auxiliary hook is outside the machine.



12.33.2 STOWING SINGLE TOP

⚠ WARNING

- **Do not wind in the wire rope too tight, Allow it to contact the top surface of the boom when the boom is horizontal.**
- **Wind the wire rope while watching the auxiliary winch wire rope.**
  If it is wound in fully, the wire guard may be damaged.

Carry out in the reverse order to setting the single top.

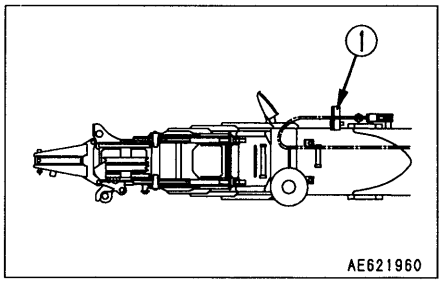
1. Stow away the auxiliary hook and remove the socket. When doing this, retract the boom fully.

2. Remove the wire rope from the single top and auxiliary winch sheave of the top boom, wind it round the bracket on top of the 1st boom, and secure the socket to the boom stowing (base) bracket.

3. Hook overwind preventive weight ① to the bracket. After the weight is secured with the lock pin, insert the slit pin.

4. Remove the stowing pin, rotate the single top body to the side of the boom, then insert the stowing pin.

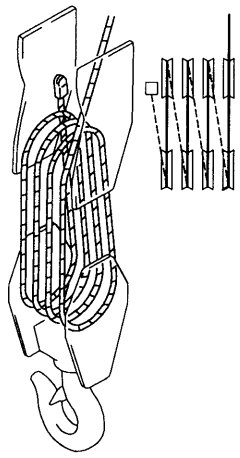
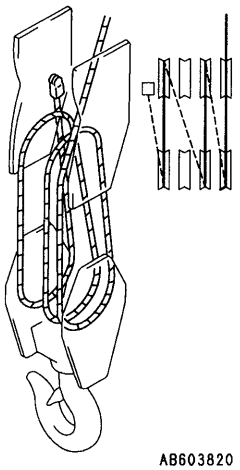
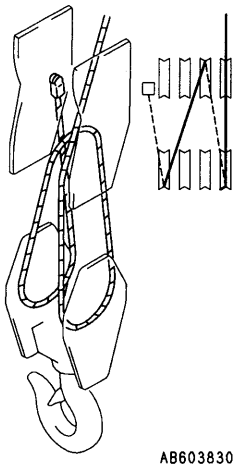
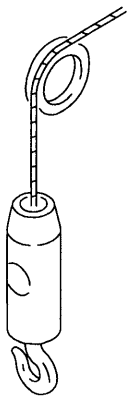
5. Wind in the wire rope.



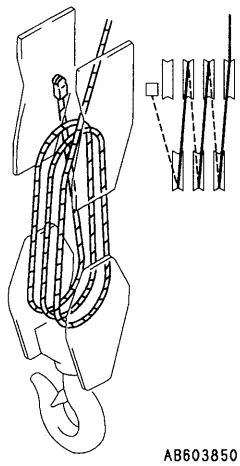
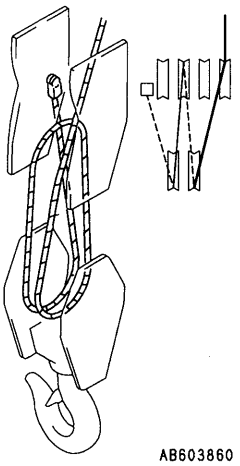
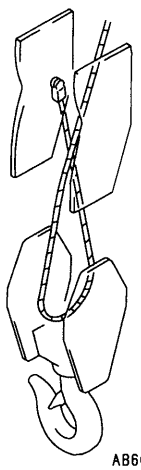
12.34 HANDLING WIRE ROPE

12.34.1 METHOD OF WINDING ON WIRE ROPE AND RATED OVERALL LOAD

- Determine the number of lengths of wire rope for the hook in accordance with the weight of the load being lifted, the length of the boom, and winding-in speed.
- The weight for each length of wire rope should not exceed 3.25 tons.

No. of lengths of rope	8	6	4	1
Method of winding on rope	 AB603810	 AB603820	 AB603830	 AB603840
Rated overall load	Max. 26 tons	Max. 19.5 tons	Max. 12.5 tons	Max. 3 tons
Weight of hook	240 kg (529 lb)	240 kg (529 lb)	240 kg (529 lb)	60 kg (132 lb)

When using optional hook

No. of lengths of rope	6	4	2
Method of winding on rope	 AB603850	 AB603860	 AB603870
Rated overall load	Max. 16 tons	Max. 12 tons	Max. 6 tons
Weight of hook	195 kg (430 lb)	170 kg (375 lb)	140 kg (309 lb)

12.34.2 REFITTING WIRE ROPE

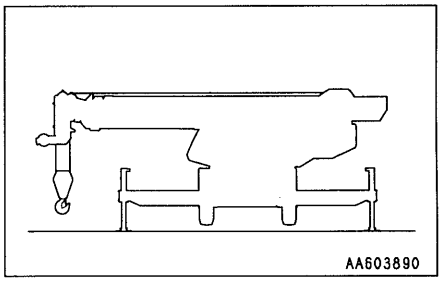
⚠ WARNING

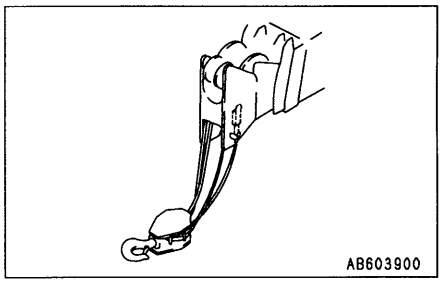
When removing or fitting wire rope, always wear thick leather working gloves.

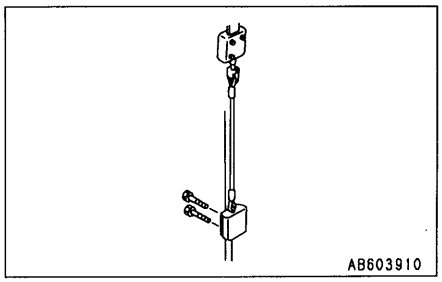
When refitting the wire rope, do as follows.

NOTICE
Be careful to wind on the rope so that it lies properly on the drum.

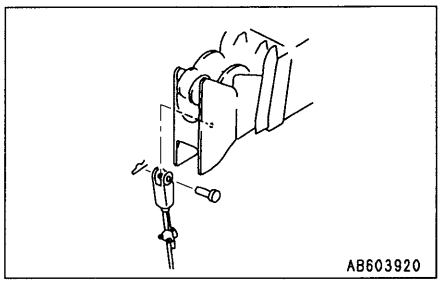
1. Extend the outriggers and fully retract the boom, then swing to the side or rear.
2. After lowering the boom, lay the hook on the ground.
3. Set the clutch lever to the "ON" position.
4. Remove the wire rope guide.
5. Remove the weight of the overwind prevention system from the wire rope.


AA603890


AB603900


AB603910

6. Remove the wire socket.
7. After removing the wire clip, use a hammer and ø10 – 14 mm (0.4 – 0.6 in) bar to remove the wire rope from the wire socket.
8. Refit the wire rope. For details, see "12.34.1 METHOD OF WINDING ON WIRE ROPE AND RATED OVERALL LOAD".


AB603920

12.34.3 REPLACING WIRE ROPE

As time passes, wire rope deteriorates because of fatigue, so replace the wire rope if it is in the following condition.

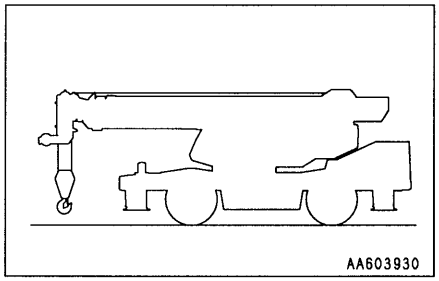
STANDARDS FOR REPLACING WIRE ROPE

- Wire rope where more than 10% of the wires in one strand (excluding filler wires) are broken.
- Wire rope where the wear diameter exceeds 7% of the nominal diameter.
- Wire rope which is twisted and has kinks.
- Wire rope with marked loss of shape or corrosion.
- Wire with abnormalities at the end stopper.

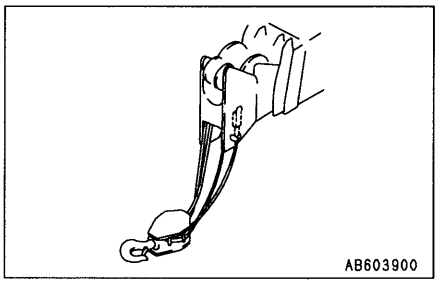
REMOVING WIRE ROPE

Remove the wire rope as follows.

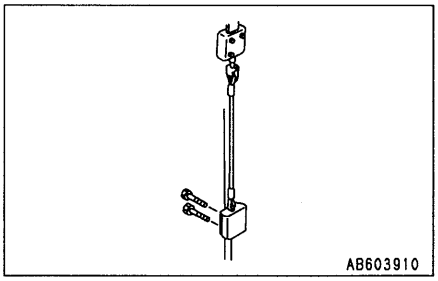
1. Retract the boom fully and place the machine on firm horizontal ground.



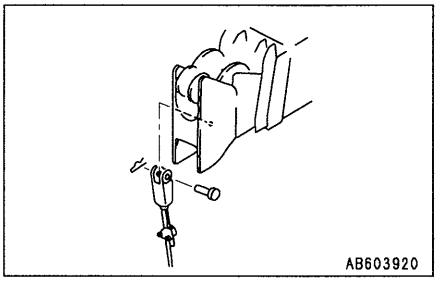
2. In the condition shown in the diagram for Step 1, wind out the main winch and lay the hook on the ground.



3. Remove the weight of the overwind prevention system from the wire rope.



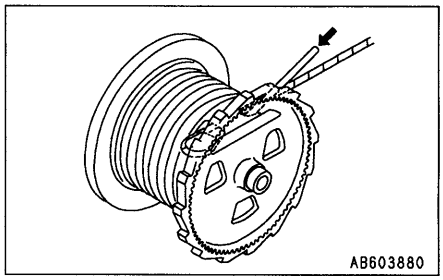
4. Remove the wire socket.
5. After removing the wire clip, use a hammer and ø10 – 14 mm (0.4 – 0.6 in) bar to remove the wire rope from the wire socket.
6. Remove the wire rope from the hook.



7. Wind out the main winch and remove the wire rope.

8. After winding the wire rope off the drum, use a hammer and bar to release the wire rope.

9. Remove all the remaining wire rope to complete the removal operation.



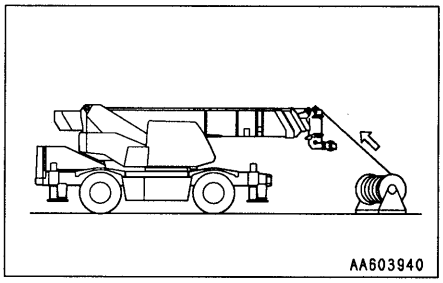
FITTING WIRE ROPE

⚠ WARNING

- **Be sure to install the wire rope and rope wedge properly.**
- **Be careful to wind in the rope so that it lies properly on the drum.**

Fit the wire rope as follows.

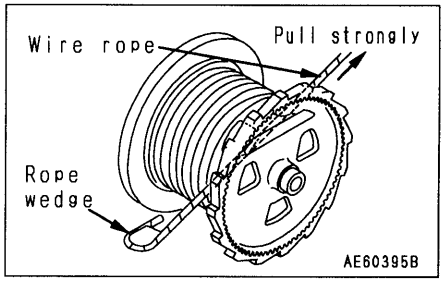
1. Take the end of the rope, and pass the rope through the load sheave at the tip of the boom, the idler sheave, rope guide, and winch drum guide sheave.



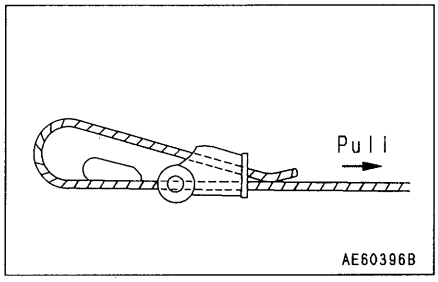
2. Pass the rope through the rope mounting hole on the drum, fit the wire on the rope wedge as shown in the diagram on the right, then pull strongly to secure the wire rope to the drum.

3. Wind in the winch slowly to wind the wire rope on to the drum.

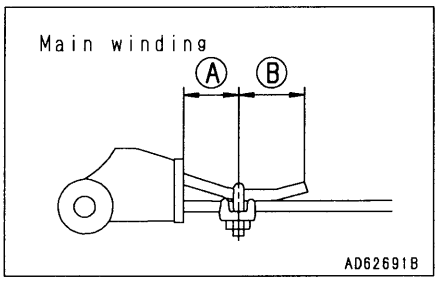
4. Depending on the number of lengths of wire rope, pass the wire rope through the sheave at the tip of the boom and the hook sheave.



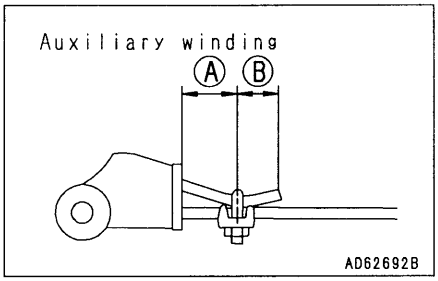
5. Install the wire sockets and rope clips to the wire rope at positions Ⓐ and Ⓑ as shown in the figure, then tighten them to the specified torque.



- Fitting positions of clips and tightening torque of nuts
  Main winding Ⓐ: 60 mm (2.4 in)
  Ⓑ: 80 mm (3.2 in)
  Tightening torque of clip nut: 17.6 – 21.6 N•m (1.8 – 2.2kgf•m)

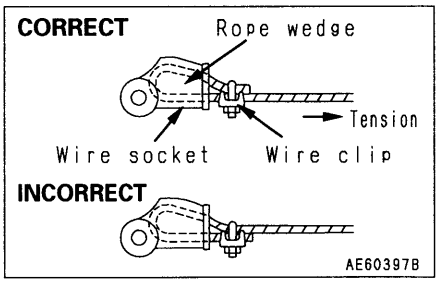


  Auxiliary winding Ⓐ: 60 mm (2.4 in)
  Ⓑ: 50 mm (2.0 in)
  Tightening torque of clip nut: 17.6 – 21.6 N•m (1.8 – 2.2kgf•m)



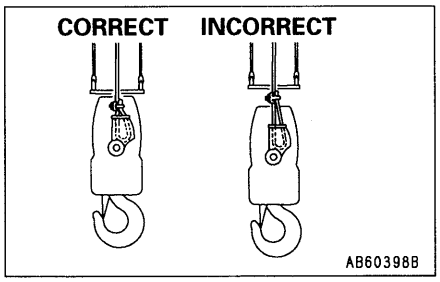
REMARK

If the above dimensions of the auxiliary winding are not maintained, may be crushed by the overwind weight when the auxiliary winding hook is stored.



6. Raise the boom to a high angle, and wind out the winch so that only a few loops of wire rope remain on the drum.

7. Apply tension to the wire rope, then wind in the winch to wind the wire rope neatly on to the drum.
   Apply a tension of approx. 500 kg (1102 lb) for each length of wire rope.



12.34.4 ACTION WHEN WIRE ROPE IS TWISTED

⚠ CAUTION

If wire rope is handled with bare hands, it may cause injury. Always wear leather working gloves.

1. Wind out the wire rope until several loops of rope is remained on the winch drum. If the hook has no abnormality, check how many turns the hook is twisted and in what direction it is twisted from the normal condition.

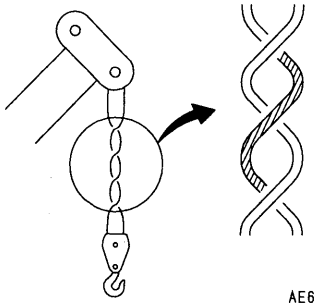
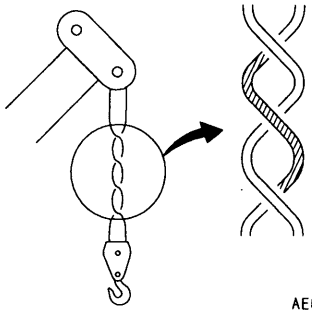
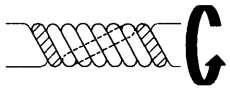
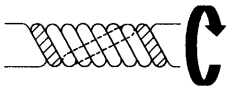
2. Lower the hook to the ground.
   (If the rope can not be wound out, lower or retract the boom to lower the hook.)

3. Remove the wire rope socket.

4. Correct the torsion (as checked in Step 1) by twisting the end of the wire rope as follows.

   1) For the rope twisted in the "Z" direction, forcibly twist in the direction that the hook is twisted.

   2) For the rope twisted in the "S" direction, forcibly twist in the direction that the hook is reversely twisted.
   Correct the twist several times as culculated from number of the turns x number of lengths of wire rope.
   If the wire rope has many twists, divide the number of forcibly twisting into several. Never twist such wire rope more than 5 times at once.

Twist of hook	① Twist in "Z" direction  AE61774B	② Twist in "S" direction  AE62461B
Method of correcting the wire rope	Forcibily twist in direction that the hook is twisted.  AE61868B	Forcibily twist in direction that the hook is reveresly twisted.  AE61869B

5. Extend the boom fully, raise it to the maximum height, then wind in and wind out the several times repeatedly.

   Apply tension to the rope and wind the rope neatly on to the winch drum.

6. Repeat the above procedure until the twisting of the hook is removed.

   If the twisting can not be removed using the above procedure, replace the wire rope with a new wire rope.

REMARK

Refitting the wire rope from the winch drum end to hook end reversely occasionally will extend the life of the wire rope.

12.35 SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

12.35.1 PRECAUTIONS BEFORE OPERATING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

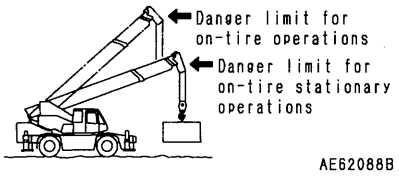
⚠ WARNING

Set MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) correctly to match the crane operation.

- **MOMENT LIMITER calculates the moment in accordance with the switch setting. If the setting is different from the actual operation, the following problems will appear, so be extremely careful when setting the switches.**

  Example) Actual work — Setting of switch
  "Travel with raised load" — "On-tire stationary"

  If the above setting is used, the safety or danger will be judged for on-tire operations, so no warning or alarm will be given when the equipment approaches the danger zone.
  As a result, if the machine enters the danger zone, the machine may suddenly turn over without warning.



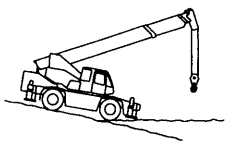
AE62088B

- **The outrigger extension width is detected automatically by the length sensor. However, whenever extending the outriggers, check that the actual width is not different from the value displayed on MOMENT LIMITER (overload prevention system) display.**

⚠ WARNING

Operate the machine only on horizontal ground.

- **MOMENT LIMITER (overload prevention system) calculates the moment assuming that the machine is horizontal.**
  If the machine is not horizontal and operations are carried out, no warning or alarm will be given even when the machine approaches the danger zone.
  In addition, an excessive moment will act on the machine and this will cause damage or breakage of the work equipment.


AE603150

12.35.2 SETTING OPERATING CONDITION OF MACHINE

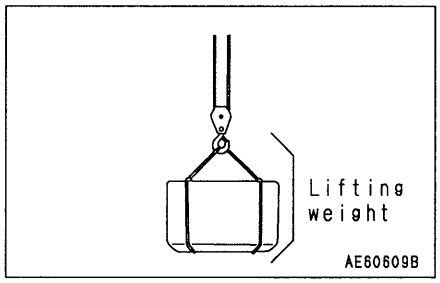
⚠ WARNING

- **The bottom row in the rated overall load table gives the danger angle. If the boom is lowered beyond this angle, even if there is no load, there is danger of the machine turning over, so never lower the boom beyond this angle.**
- **Never lower the boom suddenly. There is danger that the machine may overturn.**
- **Be careful when swinging a raised load, or when lifting a load off the ground, because the deflections of the machine body, boom or tire will make the working radius larger.**
- **The rated overall load for boom operations is the value when the jib and single top are stowed away. If the boom is operated with these extended, be careful that the actual load can be raised less than the load specified in the rated overall table.**
- **The rated overall load is different according to the direction in which the work equipment is facing, so be extremely careful when checking the rated overall table.**

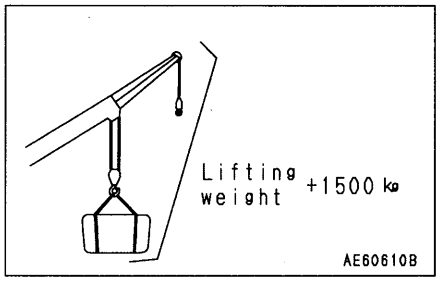
WHEN USING OUTRIGGERS

The lifting weight is the value including the weight of the hook and the lifting equipment.

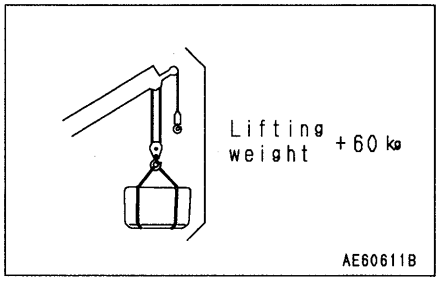
Type of hook	Main hook	Auxiliary hook
Weight of hook	240 kg (529 lb)	60 kg (132 lb)



If boom operations have to be carried out with the jib still installed, add 1500 kg (3300 lb) to the lifting weight for manual jib specifications when checking the rated overall load.



If the boom operations have to be carried out with the single top extended and the auxiliary hook installed, add 60 kg (130 lb) to the weight when checking the rated overall weight table.

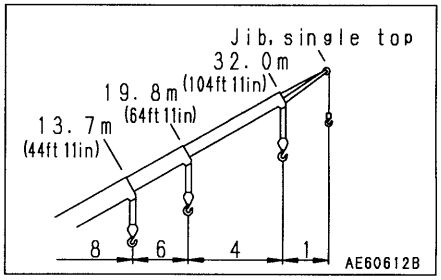


- **Number of lengths of rope**

⚠ WARNING

Set MOMENT LIMITER (overload prevention system) for the number of lengths of rope actually used for the hook.

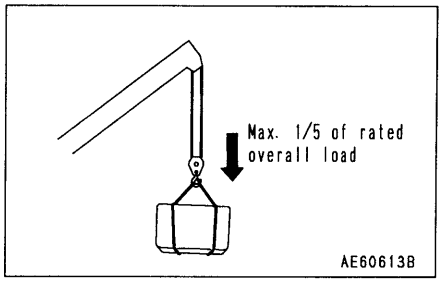
When selecting the minimum number of lengths of rope for the hook, use the table below and calculate the number of lenghts of rope which will give a maximum weight of 3.25 tons for each length of wire rope for the main hook and 3 tons for each length of wire rope for the auxiliary hook.



Type of boom	Boom			Jib
Length of boom	7.6 m (24 ft 11 in) to 13.7 m (44 ft 11 in)	13.7 m (44 ft 11 in) to 19.8 m (64 ft 11 in)	19.8 m (64 ft 11 in) to 32. 0 m (104 ft 11 in)	Independent of length of boom
No. of length of rope	8	6	4	1

- **FREE-FALL OPERATIONS**

When carrying out free-fall operations, principally there is no raised load. But when it is unavoidable, keep the weight of the raised load to less than 1/5 of the value in the rated overall weight table.

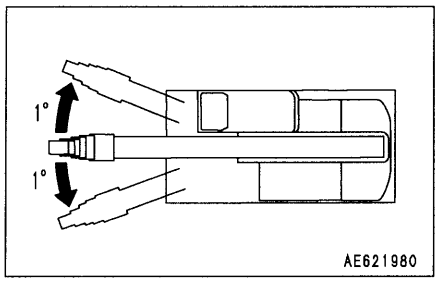


WHEN NOT USING OUTRIGGERS

The rated overall load is different for over-front operations and 360° operations, so when swinging from the front to the side, be careful not to cause overload.

Even if the alarm buzzer sounds, the swing operation is not stopped automatically, so stop the swing operation immediately.

When lifting a load off the ground at the front and swinging to the side, make sure to set the load shown in the rated overall load table for 360° operations when lifting the load off the ground at the front.



Do not carry out free-fall operations when using the jib.

Check that the tire inflation pressure is 0.9 MPa (9.0 kgf/cm^2).

Carry out operations with the boom length at a maximum of 25.9 m (84 ft 11 in).

For details of the lifting weight and number of lengths of rope, see "WHEN USING OUTRIGGERS".

When traveling with a raised load, travel at a maximum speed of 1.6 km/h (1 MPH) and use the swing lock pin (when at front), and the swing brake.

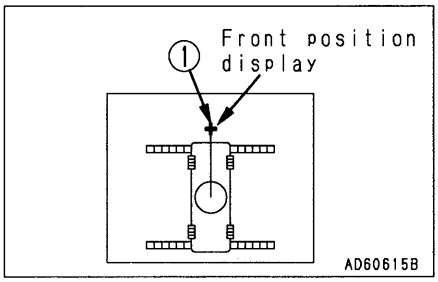
In addition, set the "swing-free" switch to "LOCK".

In the front range, plus mark "+" ① appears at the tip of the boom on the graphic display.

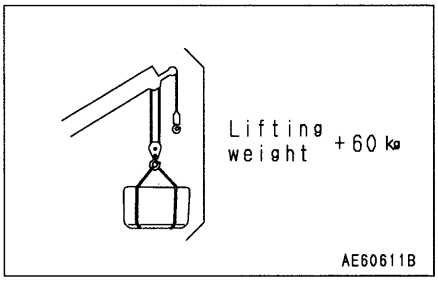
When carrying out operations to the side or rear, check that the mark "+" has gone off.

If the mark "+" goes off during operations to the side or rear, there is a failure in MOMENT LIMITER (overload preventive system). Stop operations immediately.

If operations must be continued, use the values in the rated overall weight table for 360° operations.



If the boom operations have to be carried out with the single top extended and the auxiliary hook installed, add 60 kg (132 lb) to the lifting weight when checking the rated overall weight table.



12.35.3 SETTING OPERATING CONDITIONS AND SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

When the machine condition and setting MOMENT LIMITER (overload prevention system), do as follows.

Using the rated overall weight table and working radius/height diagram, check the boom length and outrigger extension width which will satisfy the operating conditions.

The rated overall weight table and working radius/height diagram are given under "24. SPECIFICATIONS".

The explanation here assumes the following operating conditions, and explains for confirming the boom length and outrigger extension width.

Example: Operating conditions
- Lifting height: 8 m (26 ft 3 in)
- Working radius: 6.5 m (24 ft 4 in)
- Lifting weight: 14 tons

1. Calculate the maximum possible range for the lifting weight. As can be seen from the weight table below, a lifting weight of 14 tons is possible for both a boom length of 13.7 m (44 ft 11 in) and 19.8 m (64 ft 11 in) when the outriggers are fully extended or partially extended.

Outriggers fully extended (6.6m)

Outriggers fully extended 6.6m (360)						
Working radius (m) \ Boom length (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		14.20	12.30	9.80	7.00	5.90
7.0		13.00	11.60	9.25	7.00	5.90
8.0		10.00	10.00	8.25	7.00	5.90
9.0		7.90	8.70	7.45	6.30	5.50

Outriggers partially extended (5.9m)

Outriggers partially extended 5.9m (Over-side)						
Working radius (m) \ Boom length (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		13.10	12.30	9.80	7.00	5.90
7.0		11.20	11.60	9.25	7.00	5.90
8.0		8.45	9.35	8.25	7.00	5.90
9.0		6.65	7.45	7.45	6.30	5.50

AD60616B

2. Calculate the maximum possible range for the lifting weight and working radius.
If we look at the working radius of 6.5 m (24 ft 4 in), it can be seen that a lifting weight of 14 tons is possible with the outriggers fully extended and a boom length of 13.7 m (44 ft 11 in).
(Impossible with outriggers partially extended/over-side operation)

Outoriggers fully extended (6.6m)

Outoriggers fully extended 6.6m (360) X type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		14.20	12.30	9.80	7.00	5.90
7.0		13.00	11.60	9.25	7.00	5.90
8.0		10.00	10.00	8.25	7.00	5.90
9.0		7.90	8.70	7.45	6.30	5.50

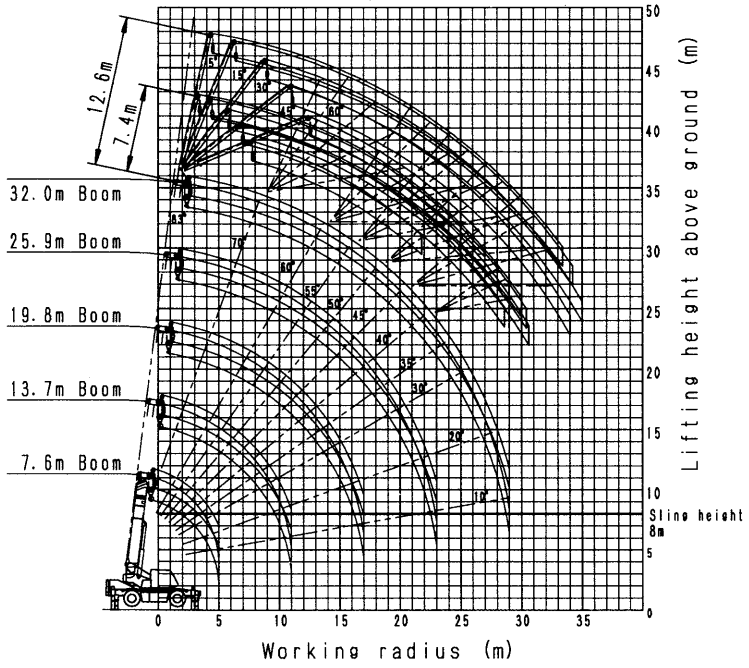
Outoriggers partially extended (5.9m)

Outoriggers partially extended 5.9m (Over-side) X type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		13.10	12.30	9.80	7.00	5.90
7.0		11.20	11.60	9.25	7.00	5.90
8.0		8.45	9.35	8.25	7.00	5.90
9.0		6.65	7.45	7.45	6.30	5.50

AD60617B

3. Calculate the maximum possible range for the lifting weight.
A lifting height of 8 m (26 ft 3 in) can be seen at each boom height in the working radius vs. lifting height diagram.

Working radius / lifting height chart



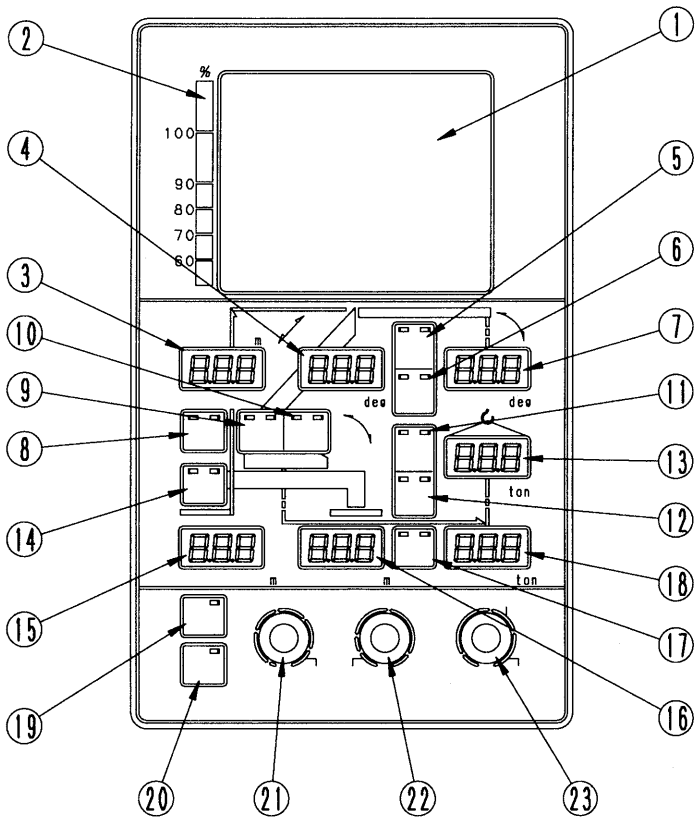
AD60618B

4. Condition of machine determined by Step 1 – 3.
   - Boom length: 13.7 m (44 ft 11 in)
   - Outriggers: Extended fully

   Set the machine in the above condition when carrying out the operation.

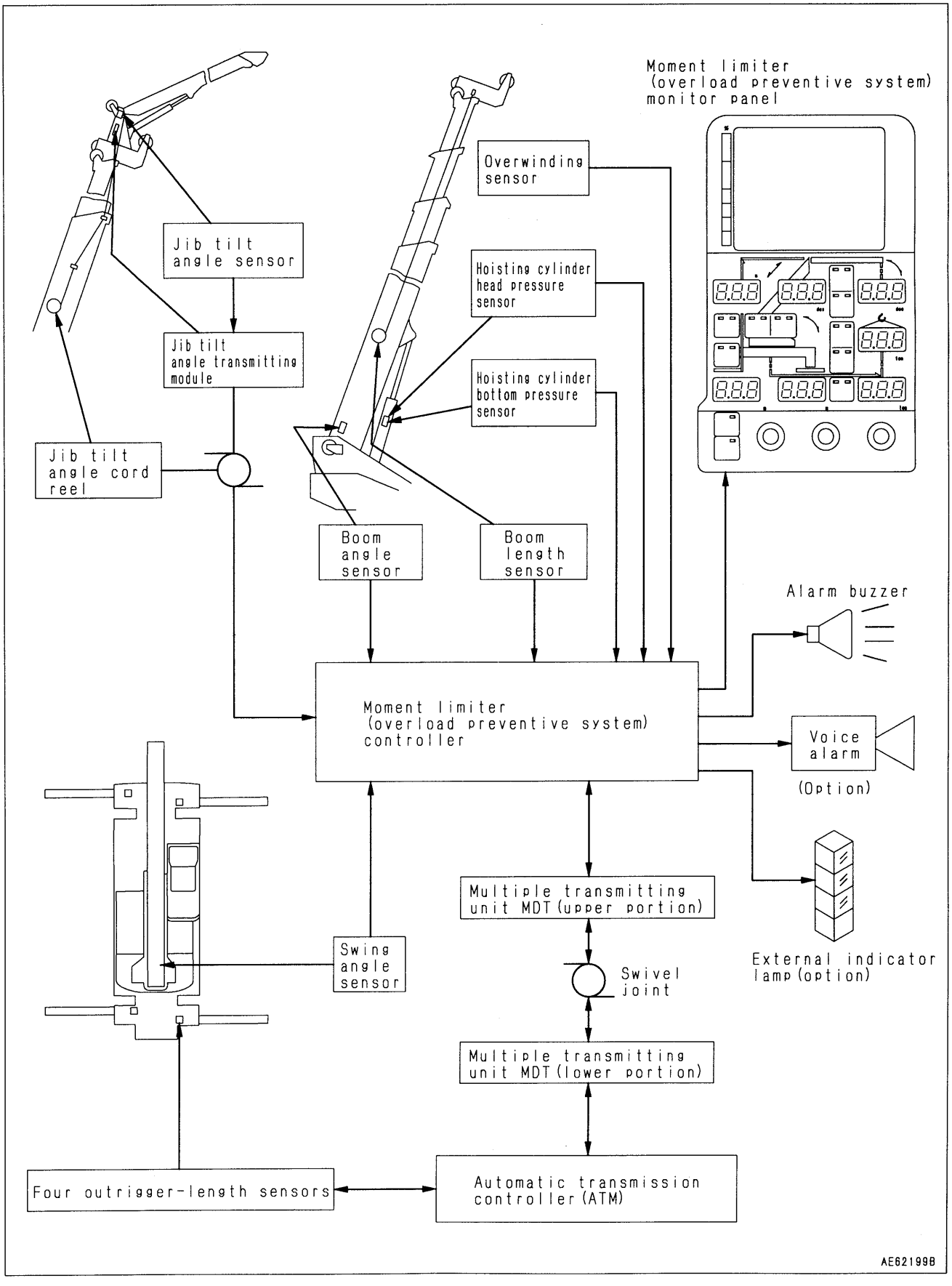
5. Set MOMENT LIMITER (overload prevention system) to match the machine condition.

12.35.4 GENERAL LOCATION ON MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) CONTROL PANEL



1. Graphic display
2. Bar graph scale
3. Lifting-height/boom-length display
4. Boom angle display
5. Boom angle upper limit setting switch
6. Boom angle lower limit setting switch
7. Jib angle dispaly
8. Lifting-height/boom-length selector switch
9. Left swing setting switch
10. Right swing setting switch
11. Target/starting-point setting switch
12. Target/ending-point setting switch
13. Actual weight display
14. Lifting height upper limit setting switch
15. Rated working radius display
16. Actual working radius display
17. Working radius upper limit setting switch
18. Rated overall load display
19. Selector switch
20. Setting switch
21. Display mode switch
22. Crane operating mode switch
23. Carrier operating mode switch

12.35.5 PRINCIPLE OF OPERATION



12.35.6 METHOD OF SETTING FUNCTIONS AND MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

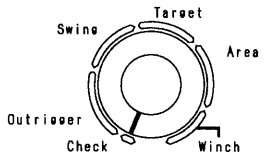
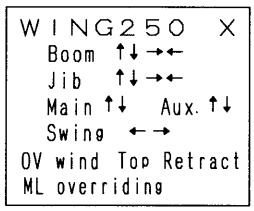
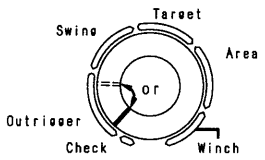
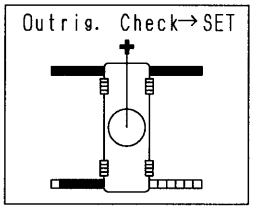
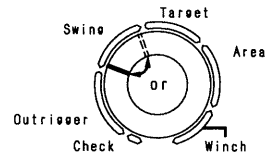
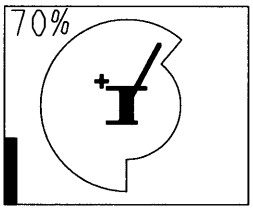
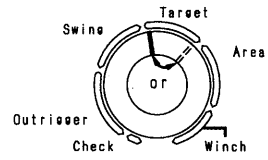
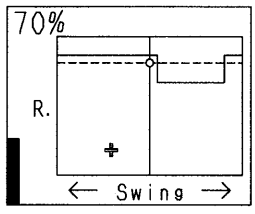
WORKING MODE SETTING SWITCH

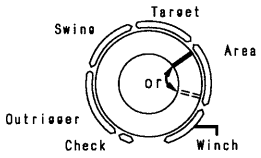
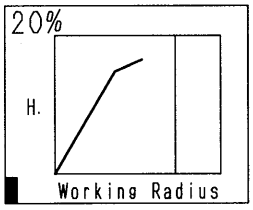
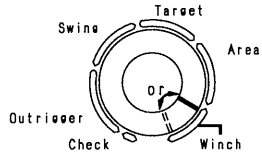
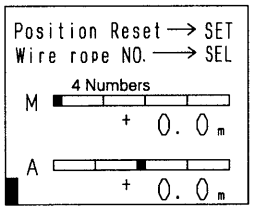
This switch is used to change the monitor panel display (graphic display) of the moment limiter (overload prevention system) to the most suitable work conditions. As the switch is turned, the display changes in turn, so always set to a position that matches the actual operating condition.

The current set value appear until set value is input to determine the work equipment performance.

The "CHECK" position is for checking before operation and differs from other switch positions.

The display can be changed as shown below.

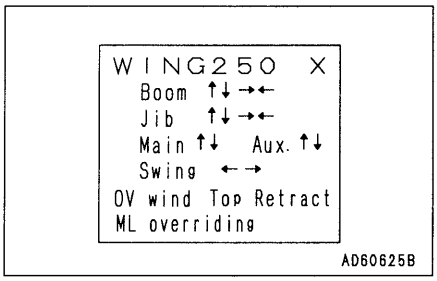
Applicable operation display	Switch	Graphic display screen	
Check mode	 Display mode AD60621B	 AD60625B	① Work equipment lever operating direction ② Overwinding ③ Top booms towing ④ Automatic stop release are displayed
Crane installation mode	 Display mode AD60622B	 AD60626B	Outrigger extension and setting are displayed
Swing zone mode	 Display mode AD60623B	 AD60627A	Change of operating radius line depending on lifting load is displayed on the basis of maximum operating radius by current boom length
Target mode	 Display mode AD60624B	 AD60628B	Swing line is mapped on a rectangular coordinates

Applicable operation display	Switch	Graphic display screen	
Derricking zone mode	 Display mode AD60629B	 AD60631B	Lift height is displayed on the basis of current boom length (jib length)
Winch mode	 Display mode AD60630B	 AD60632B	Length of wirerope drawn from reset position is displayed. (It does not vary depending on boom length and boom angle)

REMARK

1. CHECK MODE
   1) After the following warnings are output on the panel display, the check mode display appears.
      (Check mode display)
      - Moment limiter (Overload prevention system) display for weight, angle, etc.
      - Moment limiter alarm (Overload prevention system) buzzer
      - Alarm buzzer

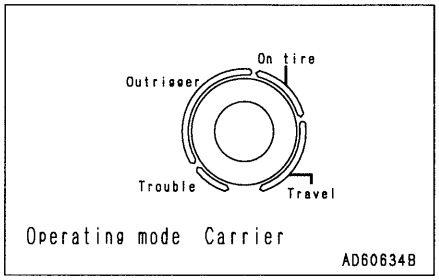
      } All lamps light up and all buzzers sound for 3 seconds.



AD60625B

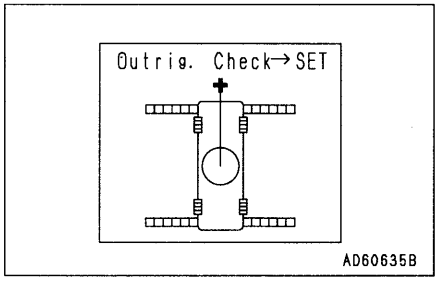
   2) In the check mode, the following operations are forced to stop automatically. These operations are not available even though you try to operate them.
      (Operations to be automatically stopped)
      Boom lowering, boom extension
      Jib Lowering, Main winch hoisting
      Auxiliary winch hoisting

2. CRANE INSTALLATION MODE
   This mode can set three pattern functions by combinating with the carrier operating mode setting switch.



AD60634B

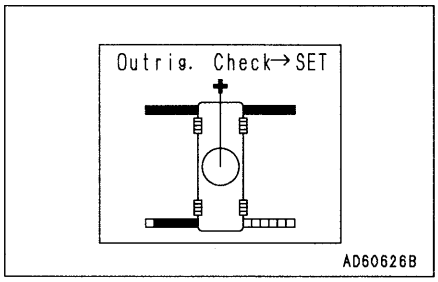
   1) "Outrig. Check → SET" pattern
      a) The initial display is shown by the following operation
         - PTO switch : ON
         - Display mode switch : crane installation position
         - Outrigger operating switch : operating
         - Carrier operating mode switch : changed to outrigger
      b) The display varies depending on slide operation



AD60635B

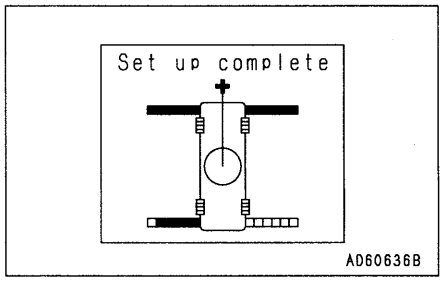
⚠ CAUTION

- **As jack up (raising by jack cylinder) is not detected, make sure that the outrigger contacts the ground and the tires float from the ground.**
- **Always insert the stopper pin and then make sure that the displayed outrigger extension width matches with the actual width.**



AD60626B

c) When the setting switch is pressed, "Set up complete" is displayed for 2 seconds.
d) After then, the display is changed to the winch mode. Input the lengths of wirerope of the main hook in the winch mode. "Set up complete" enables to start operation.

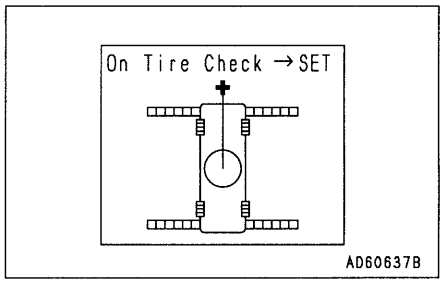


⚠ CAUTION

If display mode switch locates on a position other than "Outrigger", shift the switch to the "Outrigger" position.

2) "On Tire Check → SET" pattern
a) The initial display is shown by any operation of the following.
- PTO switch : ON
- Display mode switch : crane installation position
- Outrigger operating switch : operating
- Carrier operating mode switch : changed to on-tire

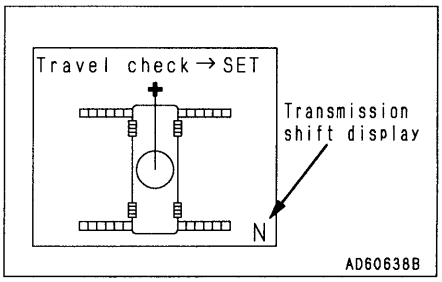
b) The display varies depending on extension sensor input value.
c) When the setting switch is pressed, "Set up complete" is displayed for 2 seconds.



⚠ CAUTION

- **Fully retract suspension cylinder and lock suspension.**
- **Check that tire inflation shows specified pressure.**

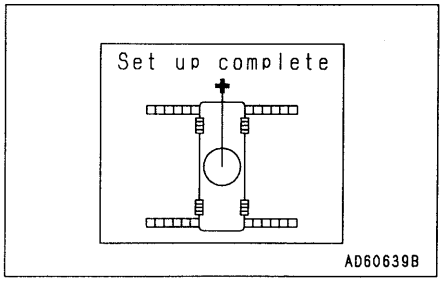
3) "Travel Check → SET" pattern
a) The initial display is shown by any operation of the following.
- PTO switch : ON
- Display mode switch : crane installation position
- Outrigger operating switch : operating
- Carrier operating mode switch : changed to outrigger



⚠ CAUTION

- **Fully retract suspension cylinder and lock suspension.**
- **Check that tire inflation shows specified pressure.**

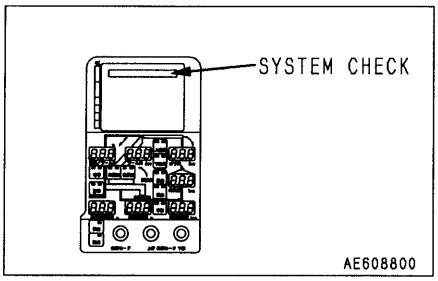
b) The display varies depending on extension sensor input value.
c) When the setting switch is pressed, "Set up complete" is displayed for 2 seconds.
- During traveling, the transmission shift position is displayed on the right side on the screen.



4) GRAPHIC DISPLAY

- The PTO switch is set to "WORK 1" or "WORK 2", the required information is displayed by selecting the display mode switch.
  If the abnormality is detected as the result of the controller self-diagnosis, the error code "EXX" is displayed.
  In this case, even when the PTO switch is set to "RUN", the error code is displayed.

- When the ignition key switch is switched from the OFF position to the ON position, "SYSTEM CHECK" is displayed for approx. 2 seconds as shown in the right figure. This is displayed to ensure that the self-diagnosis is carried out.
  Therefore, always carry out this check when starting.

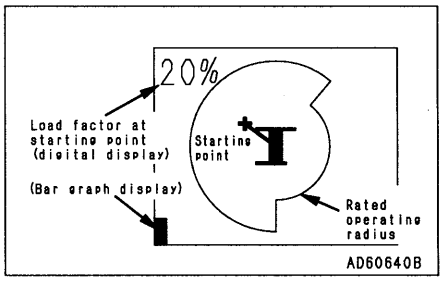


- The night lighting of the graphic display lights up or goes out by the small lamp switch when the PTO switch is set to "WORK 1" or "WORK 2". In addition, when the small lamp is ON, and when the ERROR CODE or SYSTEM CHECK, etc. is displayed, the night lighting also lights up.

- When the temperature in the cab is too low or too high, the indication of the graphic display may be weak or strong. But this is corrected by heating or cooling.
  When the display is weak or strong at the normal temperature, contact your Komatsu distributor.

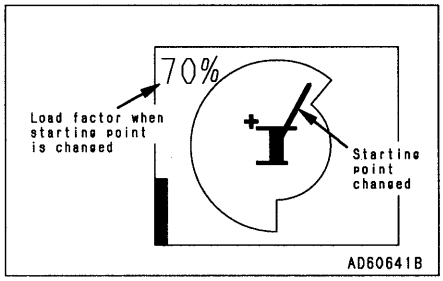
3. SWING ZONE MODE

Change of operating radius line depending on lifting load is displayed on the basis of the maximum operating radius by the current boom length.



1) Setting of target
When the starting or ending point of target switch is pressed, the target is set. (Target point can be set up to two points; starting or ending point.)

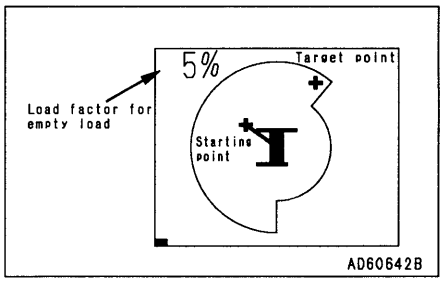
2) The display moves according to load movement (change of boom top point).



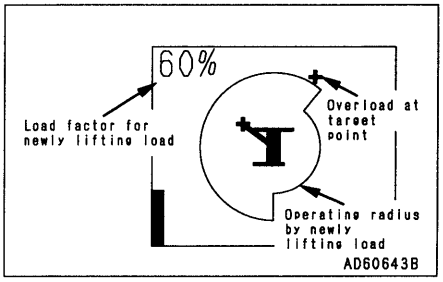
3) Load factor display
- The load factor is automatically calculated from the lifting load when setting the starting point and is displayed by digital number and bar graph.
- The operating radius line is displayed depending on the outriggers extension status.

⚠ CAUTION

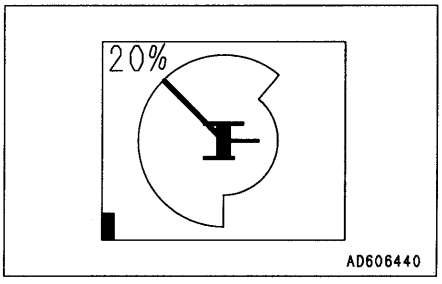
Rated operating radius varies depending on boom length and lifting load.
When lifting load is swaying due to incorrect lifting, display of rated operating radius is unstable.



4) Overload warning monitor
   a) When moving to the target point (starting point) without load, rated operating radius and load factor without load are displayed.
   b) Newly lifting a load
   Rated operating radius and load factor are changed to a new load value.
   c) Overload can be known by observing the target value of the ending point exceeds the operating radius.

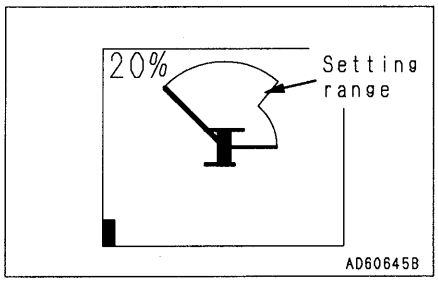


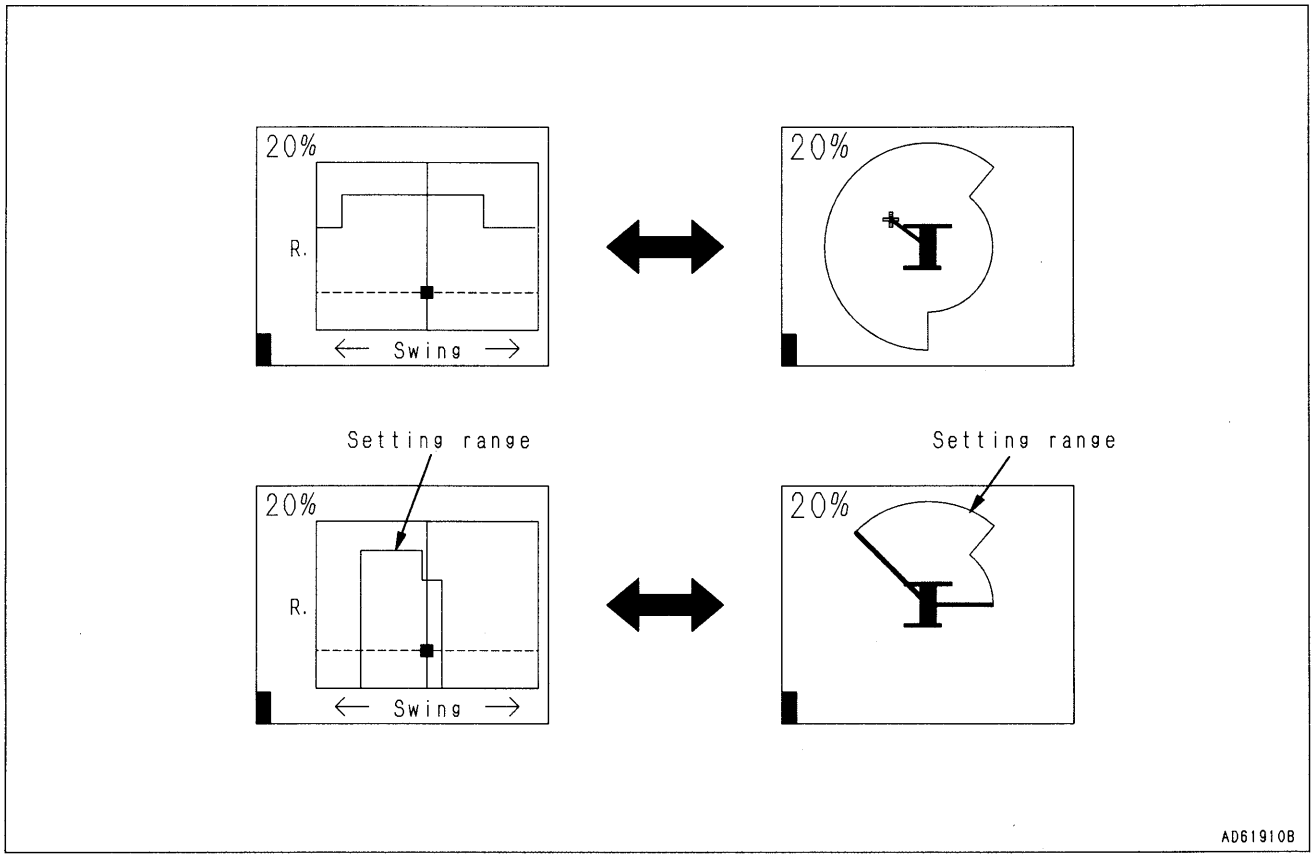
5) Swing display (swing zone limit)
This is used to set desired swing radius.
   a) When the left swing setting switch is pressed, a line from the current swing position to the maximum operating radius is displayed and simultaneously the LED (green) in the switch lights up.
   b) When the right swing setting switch is pressed, if left swing zone limit has been already set, the setting range is displayed by two lines and simultaneously the LED (green) in the switch lights up.
   (For both item a) and b), when the swing approaching the specified value, the notice buzzer sounds beforehand intermittently, "CAUTION" display appears and the LED (red) flashes. Further, the swing exceeds the specified value, the display is changed to "STOP", the LED (red) lights up and the alarm buzzer sounds intermittently.)



6) Operating radius zone

a) When the operating radius upper limit setting switch is pressed, the set operating radius upper limit line is displayed. At the same time, the LED (green) in the switch lights up.
(Before exceeding the specified value, "CAUTION" display and the LED (red) in the switch flashes and the notice buzzer sound intermittently.
When exceeding the specified value, it changes to "STOP" display, the LED (red) in the switch lights up, the warning buzzer sounds continuously, and "Boom lowering and jib lowering" stops automatically.)





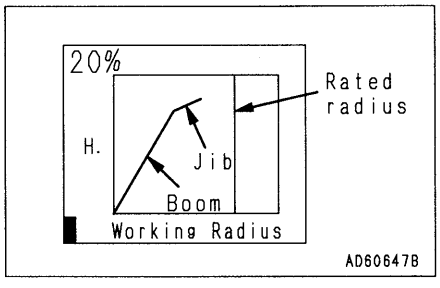
4. TARGET MODE (rectangular coordinates)

The display in the swing zone mode is mapped on rectangular coordinates.

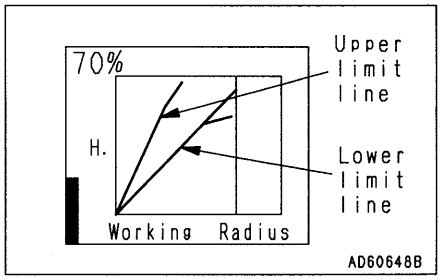
5. DERRICKING MODE (operating zone limit)

This can set the boom (including jib) upper limit, lower angle limit, height upper limit, etc., and can know the movable range at ease.

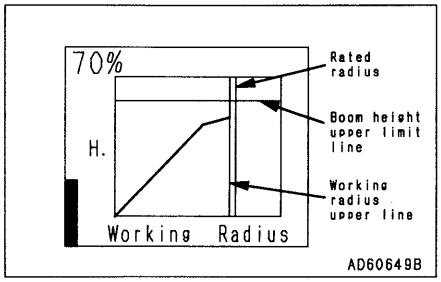
1) These limits are displayed on the basis of the maximum lift height at the current boom length (jib length).
The rated operating radius varies depending on lifting load.



2) Setting of boom angle upper and lower limits
   a) When the boom angle upper limit setting switch is pressed, the set boom angle upper line is displayed. At the same time, the LED (green) in the switch lights up.
   b) When the boom angle lower limit setting switch is pressed, the set boom angle lower limit line is displayed. At the same time, the LED (green) in the switch lights up.
   (For both items a) and b), when the operation approaching the specified value, "CAUTION" display appears beforehand, the LED (red) inside the switch flashes and the intermittent notice buzzer sounds. Further, the operation exceeds the specified value, the display changes to "STOP", the LED (red) inside the switch lights up, the continuous alarm buzzer sounds, and for item a); "Boom raising" stops automatically, and for item b); "Boom lowing" stops automatically.)



3) Setting of lifting height upper and operating radius limit
   a) When the lifting height upper limit setting switch is pressed, the set boom height upper line is displayed. At the same time, the LED (green) in the switch lights up.
   b) When the operating radius upper limit setting switch is pressed, the set operating radius upper limit line is displayed. At the same time, the LED (green) in the switch lights up.
   (For both items a) and b), when the operation approaching the specified value, "CAUTION" display appears beforehand, the LED (red) inside the switch flashes and the intermittent notice buzzer sounds. Further, the operation exceeds the specified value, the display changes to "STOP", the LED (red) inside the switch lights up, the continuous alarm buzzer sounds, and for item a); "Boom raising and jib raising" stop automatically, and for item b); "Boom lowering and jib lowering" stop automatically.)



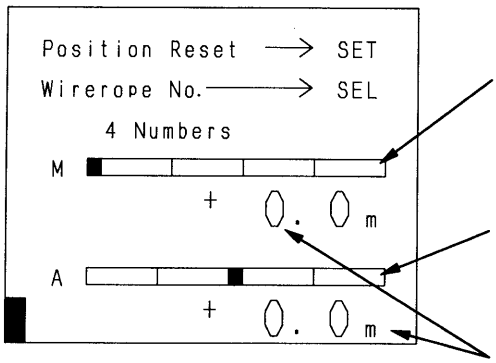
⚠ CAUTION

Moment limiter (overload preventive system) automatic stop is not provided with slow stop function. If the warning sounds, reduce the engine speed and return the lever carefully not to avoid load sway.

REMARK

The setting of operating range limit is released by pressing the same switch again.

6. WINCH MODE DISPLAY



In the Main, the point moves in the right direction each time the hook moves 15mm-20mm (0.6in-0.8in)/number of lengths. If moves according to movement of the hook from the left to right direction.

In the Auxiliary, the point moves in the right direction each time the hook moves 15mm-20mm (0.6in-0.8in). It moves according to movement of the hook from the left to right direction.

Change of hook lifting height
Displays the detected wirerope length drawn from the reset position. (It does not changed by the boom length and boom angle.) Because this value has approx. 15% error, use this only as reference during operation. To return to zero, press the setting switch.

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⚠ CAUTION

- **Winch mode display is only reference of the movement when the winch winds-in or winds-out slowly.**
  When the winch winds-in, winds-out fast or is used in free-fall, the error of the above display and the change of hook lifting height become bigger.
- **Graphic display is only reference having some error. When the lifting load is not visible, obey the hand signals of the guard.**

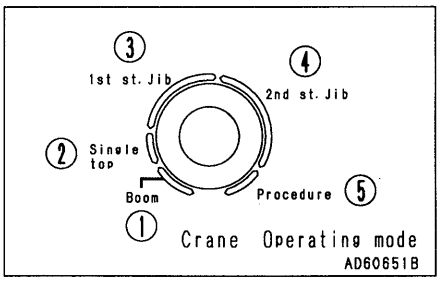
CRANE OPERATING MODE SETTING SWITCH

Select the moment limiter (overload prevention system) performance depending on the work equipment conditions.

The display is changed in turn by rotating the switch. Set the switch position suitable for the actual operation conditions.

⚠ WARNING

If operation is carried out at incorrect position, the moment limiter (overload prevention system) functions incorrectly and incorrect function causes injury or death by machine turnover and damage to surroundings.

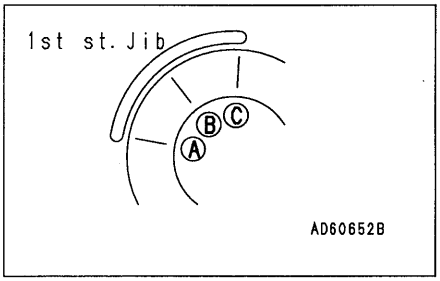


① Boom

Used for the main winching operation with the jib and single top stowed.

② Single top

Used for the auxiliary hoisting with the jib stowed.

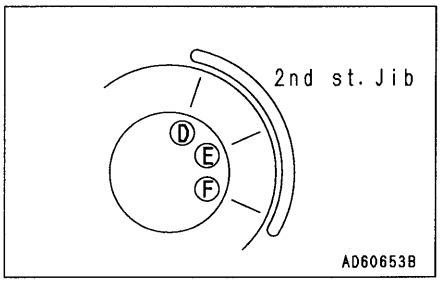


③ 1st st. jib

Used for auxiliary hoisting with the jib first stage extended.

- For power tilt
  jib operation : the same function is expected by setting the dial to any position of Ⓐ , Ⓑ or Ⓒ .
- For manual
  jib operation: Ⓐ: tilt angle 5°
  Ⓑ: tilt angle 25°
  Ⓒ: tilt angle 45°

Always check the jib angle on the panel.



④ 2nd st. jib

Used for auxiliary hoisting with the jib second stage extended.

- For power tilt
  jib operation: the same function is expected by setting the dial to any position of Ⓓ , Ⓔ or Ⓕ .
- For manual
  jib operation : Ⓓ: tilt angle 5°
  Ⓔ: tilt angle 25°
  Ⓕ: tilt angle 45°

Always check the jib angle on the panel.

④ Procedure

Used for jib extending and stowing operation.

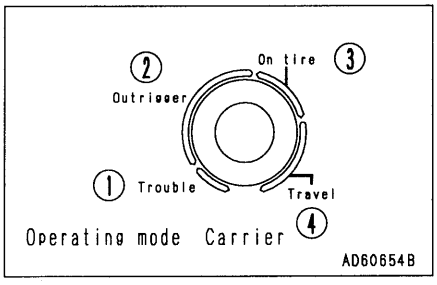
CARRIER OPERATING MODE SETTING SWITCH

Select the moment limiter (overload prevention system) performance depending on the work equipment conditions.

The display is changed in turn by rotating the switch. Set the switch position suitable for the actual operation conditions.

⚠ WARNING

If operation is carried out at incorrect position, the moment limiter (overload prevention system) functions incorrectly and incorrect function can cause injury or death by machine turnover or damage to surroundings.



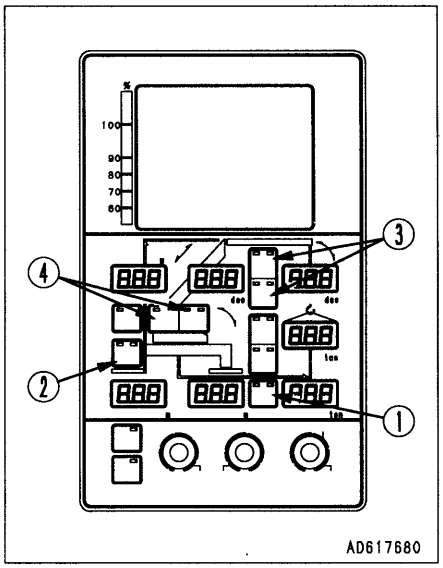
① Trouble
Used when outrigger automatic extension width detection does not function, but operation has to be continued inevitably.

② Outrigger
Used for operation while the outrigger is jacked up and the machine stops on the ground.

③ On tire
Used for operation while the outrigger is not jacked up and operation is stopped.

④ Travel
Used for operation while the outrigger is not jacked up and the machine is traveling.

The operating radius limit setting switch can be set at any position of the display mode switch. Select the most suitable display to check it.



OPERATING RADIUS UPPER LIMIT SETTING SWITCH ①

This switch is used to set the operating radius upper line when setting the operation zone limit.

- When the switch is pressed, the calculated operating radius is stored as set value.
- Then the LED (green) in the switch lights up.
  (When the operation approaching the specified value, the notice buzzer sounds intermittently, "CAUTION" display appears, the LED (red) flashes beforehand. Further, the operation exceeds the specified value, the display is changed to "STOP", the LED (red) lights up, the alarm buzzer sounds continuously and the machine stops automatically. To cancel the setting, press the setting switch again, then the LED (green) goes off and the setting canceled.)

LIFTING HEIGHT UPPER LIMIT SETTING SWITCH ②

This switch is used to set the boom upper height when setting the operation zone limit.

- When the switch is pressed, the calculated lifting height is stored as set value.
- Then the LED (green) in the switch lights up.
  (When the operation approaching the specified value, the notice buzzer sounds intermittently, "CAUTION" display appears, the LED (red) flashes beforehand. Further, the operation exceeds the specified value, the display is changed to "STOP", the LED (red) lights up, the alarm buzzer sounds continuously and the machine stops automatically. To cancel the setting, press the setting switch again, then the LED (green) goes off and the setting canceled.)

BOOM ANGLE UPPER AND LOWER LIMITS SETTING SWITCH ③

This switch is used to set the boom angle upper and lower limits when setting the operation zone limit.

- When the boom angle upper limit setting switch is pressed, the calculated boom angle is stored as set value.
- When the boom angle lower limit setting switch is pressed, the calculated boom angle is stored as set value.
- In either case, the related LED (green) in the switch lights up.
  (When the operation approaching the specified value, the notice buzzer sounds intermittently, "CAUTION" display appears, the LED (red) flashes beforehand. Further, the operation exceeds the specified value, the display is changed to "STOP", the LED (red) lights up, the alarm buzzer sounds continuously and the machine stops automatically. To cancel the setting, press the setting switch again, then the LED (green) goes off and the setting canceled.)

LEFT AND RIGHT SWING SETTING SWITCH ④

This switch is used to set the left and right swinging range when the swinging range is set.

- When the left swinging setting switch is operated, the calculated boom angle (left) of this time is stored as the setting value.

- When the right swing setting switch is operated, the calculated boom angle (right) of this time is stored as the setting value.

- When either is set, LED (green) inside the switch lights up. (When the operation approaching the specified value, the notice buzzer sounds intermittently, "CAUTION" display appears, the LED (red) flashes beforehand. Further, the operation exceeds the specified value, the display is changed to "STOP", the LED (red) lights up, the alarm buzzer sounds continuously and the machine stops automatically. To cancel the setting, press the setting switch again, then the LED (green) goes off and the setting canceled.)

⚠ CAUTION

When the swing is set, the swing is not automatically stopped.

For the buzzer sounding range, see "NOTICE and WARNING output table".

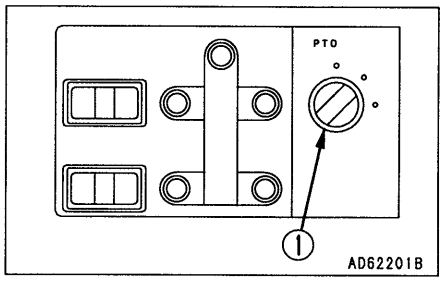
REMARK

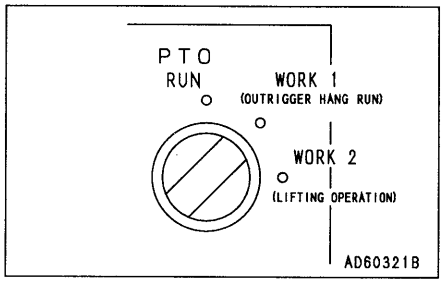
- The setting of the operation range is automatically canceled in the following case.
  1) The lower operation mode is changed
  2) The PTO switch is set to "RUN"
  3) After the starting switch key was set to OFF, more than two hours has past
- When each of the operation range setting is automatically stopped, in order to cancel it, move the work equipment a little toward the original status.

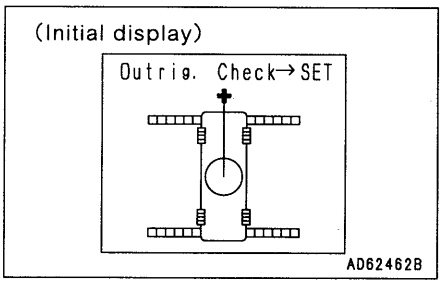
EXTENDING OUTRIGGER AND PREPARING OPERATION

Carry out the outrigger extension operation in the following procedures.

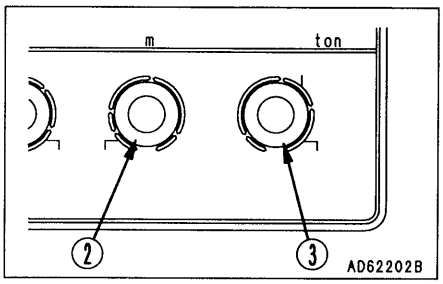
1. Set PTO switch ① to "WORK 1".
   "Initial display" appears on the graphic display portion of the moment limiter (overload prevention system) panel.

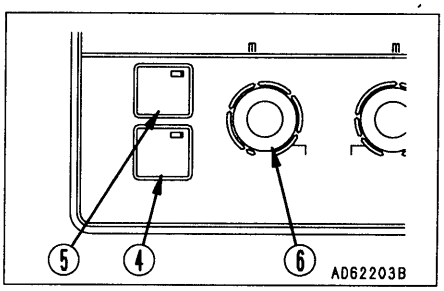




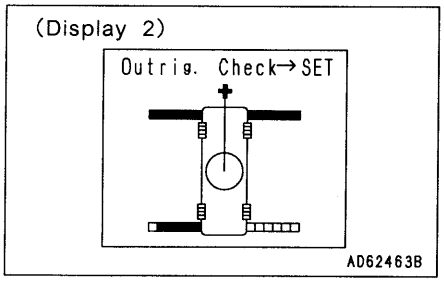


2. Set the operation mode to the desired mode by operating upper operation mode switch ② and lower operation mode switch ③. For the setting method, see the contents of "Crane operating mode setting switch" and "Carrier operating setting mode switch".





3. Extending the outrigger
   In the graphic of the panel, the extended portion of the outrigger is painted (Display 2).
   After the outrigger is extended, always make sure that the actual extension width matches to the graphic indication.

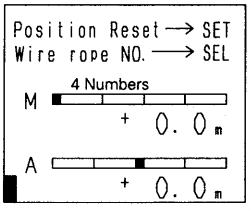


⚠ CAUTION

After the outrigger is operated, always insert the lock pin and make sure of the outrigger extension width.

4. Press operation mode setting switch ④ to set the outrigger, etc. When the setting is received, the set sound is produced and the indication of the panel graphic is changed. ... (Display 3)
   - When both the crane and the carrier operating mode switch are impossible (for example, jib + on-tire), they cannot be set and the set sound is not produced and the indication is not changed.

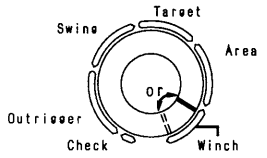
(Display 3)



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5. Select the length of wirerope for the main hook.
   - When it is same as the indication, press setting switch ④.
   - When it is different from the indication, by pressing select switch ⑤, the length of wirerope for the main hook changes as 2 → 4 → 6 → 8 → 2 → ... . At the time when the indication is same to the actual one, press the setting switch to select. ... (Display 3)

6. Set display mode setting switch ⑥ to the desired (actual operation) mode.

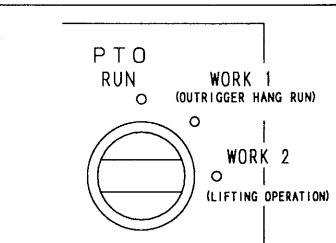


Display mode

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7. Set PTO switch ① to "WORK 2"
   Here, the operation can be started.

   In the following cases, because the outrigger setting is canceled, perform the setting again.
   - When the outrigger is operated (except the preparation mode)
   - When the PTO switch is set to "RUN"
   - After the starting switch is set to OFF, more than 2 hours has past
   - When the carrier operating mode switch is changed



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TROUBLE POSITION

⚠ WARNING

If the system detecting the extension width of the outrigger has trouble, repair it immediately.
If operation has to be continued inevitably, make sure the status of the extension width of outrigger, and input manually to the safety side.

If an abnormality occurs in the system detecting the extension width of the outrigger, the work equipment goes into automatic stop status.

In such cases, repair it immediately. But if it takes long time to repair it and if it is judged that stopping operation is dangerous, this position is used to input the extension width of outrigger manually for emergency.

Each time Outrigger Length Sensor is at fault, one of the following error code appears.
OSS error E21
OSS error E22
OSS error E23
OSS error E24
OSS error E25
In such cases, set the CARRIER operation mode switch to TROUBLE Position to use manual operation.

As the following operations will release Emergency, reset Emergency Position.
- Outrigger is operated
- PTO switch is set to "RUN"
- Start switch is set to "OFF"
- Carrier operating mode Switch is set to position other than Trouble.

⚠ CAUTION

External warning lamp (option) lights up to red when Emergency Outrigger is set.

Method of setting Outrigger Emergency

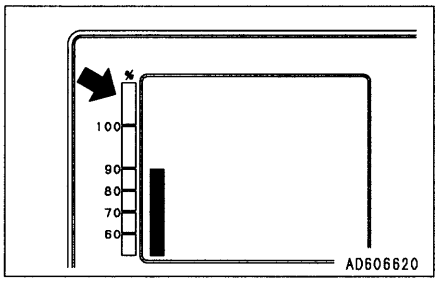
Operation indicated	Content of Graphic Display Message	Setting Method
Outrigger emergency setting	Outrigger emergency setting	1) When Outrigger Emergency Setting is input, "Outrigger Emergency Setting" is displayed for 2 seconds on the graphic display. 2) Then, "Front Right Extended Width → Select" and "Decision → Select" are displayed alternately. Each time Select SW is pushed, Outrigger graphic display changes by the bar; for the X-shaped outrigger's machine, 5 stages from Max. to Min., and for the H-shaped outrigger's machine, 6 stages. For the extended width of each stage. See the rated total load table. 3) After extension width in the indicator matches with actual width, press setting switch to input extension width. 4) Input Front Left, Rear Right and Rear Left in the same way. 5) After inputting Rear Left, "Setting is completed." is displayed. In this way, "Outrigger emergency setting" is completed.

BAR GRAPHIC SCALE (load factor display)

Indicates the ratio of the actual load (including sling weight) to the rated net load in percentage.

$$\text{Load factor} = \frac{\text{Actual load}}{\text{Rated net load}} \times 100\ \%$$

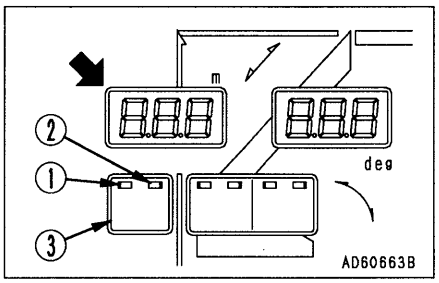
The load factor appears as bar graph for the left end of the graphic display for swing area, target, derricking area or winch.



LIFTING HEIGHT/BOOM LENGTH DISPLAY

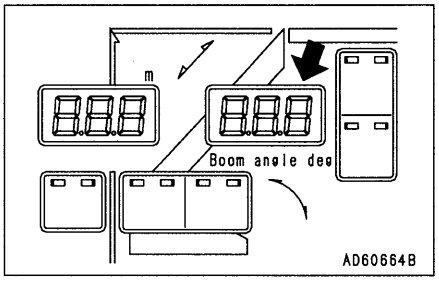
Displays lifting height when the lifting display lamp ① is lighting and boom length when Boom Length display lamp ② is lighting.

Use Lifting Height/Length Selector SW ③ to change the mode.



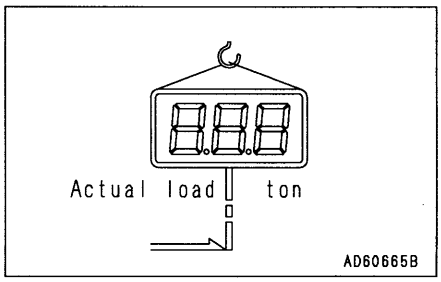
BOOM ANGLE DISPLAY

Indicates the boom derricking angle from horizontal plane.



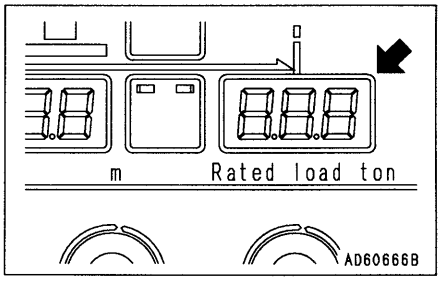
ACTUAL LOAD DISPLAY

Indicates the weight of actual load (including the weight of hook and sling).



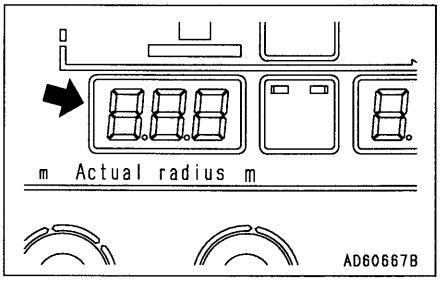
RATED NET LOAD DISPLAY

Indicates rated net load in actual operation.



ACTUAL OPERATING RADIUS

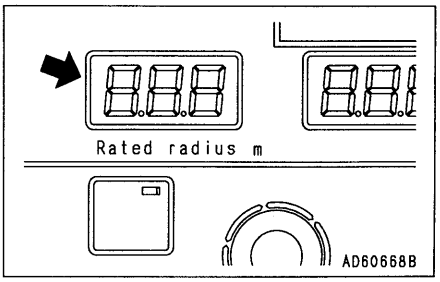
Indicates operating radius in actual operation.
Indicated value includes the deflection of the boom.



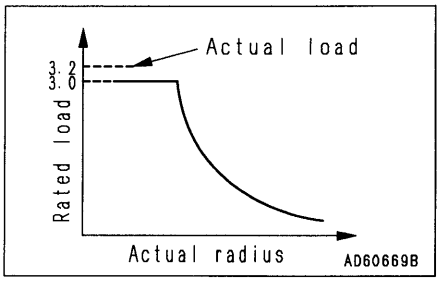
RATED OPERATING RADIUS DISPLAY

⚠ CAUTION

- **For light duty operation or small load factor operation, display may be unstable or produce error.**
- **If load exceeds the maximum rated net load specified for each operation mode, rated operating radius indicates "0.0". For example, when single top lifts 3.2 tons as shown in the right-hand illustration, the value "0.0" appears.**

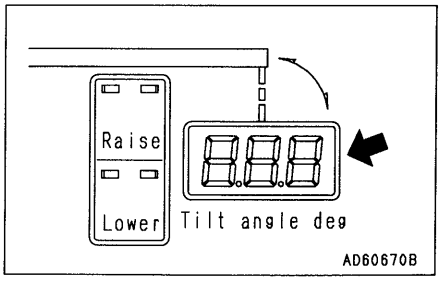


Indicates the operating radius that can tilt the jib fully while lifting a load.
Indicated value includes the deflection of the boom.



JIB ANGLE DISPLAY

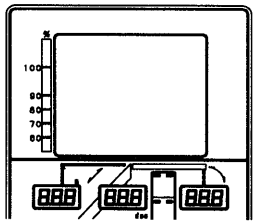
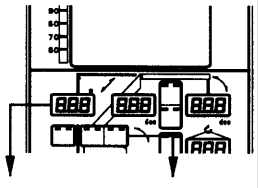
Indicates jib angle when operating jib.
For fixed tilt jib specification machine, displayed value varies according to the upper operation mode SW.

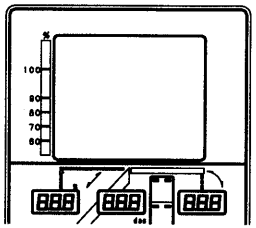
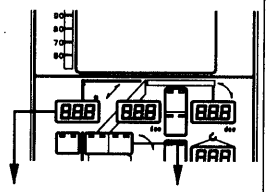


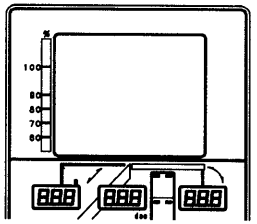
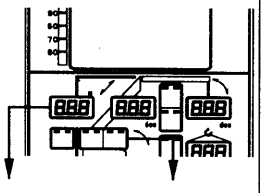
WARNING/ALARM OUTPUT TABLE

The table below shows the working conditions and their outputs.

Warning/alarm output: Output / Condition		Graphic display message (AD60671B)	Display LCD flashing (AD60672B)	Setting SW LED Lighting /flashing	Moment limiter (overload preventive system) alarm (buzzer): Loud alarm	Moment limiter (overload preventive system) alarm (buzzer): Low alarm	External warning lamp (option)	Voice alarm (option)	Remarks
Overload	Warning (90% to less 95%)	XX% Caution ! Overload (XX : load factor)	—	—	—	Intermittent (twice/second)	Yellow	Operation stops soon	Alarm outputs if operating to danger side (when hoisting, lowering or lifting). Buzzer sounds when (warning and alarming) overload
	Warning (95% to less 100%)					Intermittent (four times/second)	Yellow		
	Alarm (100% or more)	Stop ! radius set	—	—	—	Continuous	Red	Overload (only once)	
	Alarm (110 % or more)							Overload/Danger (repeating)	
Swing alarm	Warning (less 15 degrees)	Caution ! swing	—	—	—	Intermittent (twice/second)	—	Stop swing	Buzzer/alarm output when operating swing to danger side
	Warning (less 8 degrees)					Intermittent (four times/second)			
	Alarm	Stop ! swing	—	—	—	Continuous	—	Danger/Stop swing	Buzzer/alarm sounds when operating swing to danger side while holding swing position out of swing limit.
Overwinding		Stop ! overwinding	—	—	—	Continuous	Red	Danger	
Boom angle upper limit	Warning (less 5 degrees)	Caution ! raise limit	○	—	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm sounds only when raising boom
	Warning (less 2 degrees)					Intermittent (four times/second)			
	Alarm	Stop ! raise limit	○	—	—	Continuous		Operation stops at upper limit	
Boom angle lower limit (dangerous angle to turnover)	Warning (less 10 degrees)	Caution ! lower limit	○	—	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm sounds only when lowering boom
	Warning (less 5 degrees)					Intermittent (four times/second)			
Jib angle to ground ≦ 0°	Warning (less 8 degrees)	Caution ! jib horizon	—	—	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm sounds only when lowering jib (boom)
	Warning (less 4 degrees)					Intermittent (four times/second)			
Jib tilt angle ≦ 5°	Warning (less 8 degrees)	Caution ! tilt limit	—	—	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm sounds only when lifting jib (only for power tilting specification machine only)
	Warning (less 4 degrees)					Intermittent (four times/second)			
	Alarm	Stop ! tilt limit	—	—	—	Continuous	—	Danger	Buzzer/alarm sounds only when lifting jib (for power tilting specification machine only)

Warning/alarm output / Condition		Output	 AD60671B	 AD60672B		Moment limiter (overload preventive system) alarm (buzzer)		External warning lamp (option)	Voice alarm (option)	Remarks
			Graphic display message	Display LCD flashing	Setting SW LED Lighting /flashing	Loud alarm	Low alarm			
Jib tilt angle 61° ≦		Warning (less 8 degrees)	Caution ! tilt limit	—	—	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm sounds only when lowering jib (for power tilting specification machine only)
		Warning (less 4 degrees)					Intermittent (four times/second)			
		Alarm	Stop ! tilt limit	—	—	—	Continuous	—	Danger	Buzzer/alarm sounds only when lowering jib (for power tilting specification machine only)
Preparation mode			Caution ! overwind cutout	—	—	—	—	Red		Operation does not automatically stop due to overwinding
Operation range/limit	Operating radius limit	Warning (less 2 m)	Caution ! radius set	—	Flashing (red)	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm output only when lowering and extending boom (jib)
		Warning (less 1 m)					Intermittent (four times/second)			
		Alarm	Stop ! radius set	—	Lighting (red)	—	Continuous	—	Operation stops at set limit	
	Lifting height limit	Warning (less 2 m)	Caution ! height set	—	Flashing (red)	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm output only when lifting and extending boom (jib)
		Warning (less 1 m)					Intermittent (four times/second)			
		Alarm	Stop ! height set	—	Lighting (red)	—	Continuous	—	Operation stops at set limit	
	Upper angle limit	Warning (less 5 degrees)	Caution ! raise set	—	Flashing (red)	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm output only when lifting boom
		Warning (less 2 degrees)					Intermittent (four times/second)			
		Alarm	Stop ! raise set	—	Lighting (red)	—	Continuous	—	Operation stops at set limit	
	Lower angle limit	Warning (less 10 degrees)	Caution ! lower set	—	Flashing (red)	—	Intermittent (twice/second)	—	Operation stops soon	Buzzer/alarm output only when lowering boom
		Warning (less 5 degrees)					Intermittent (four times/second)			
		Alarm	Stop ! lower set	—	Lighting (red)	—	Continuous	—	Operation stops at set limit	
	Left swing limit	Warning (less 15 degrees)	Caution ! left swing	—	Flashing (red)	—	Intermittent (twice/second)	—	Stop swing operation	Buzzer/alarm output only when left swing operation
		Warning (less 8 degrees)					Intermittent (four times/second)			
		Alarm	Warn ! left swing	—	Lighting (red)	—	Continuous	—	Danger ! Stop swing operation	

Warning/alarm output / Condition			 AD60671B	 AD60672B		Moment limiter (overload preventive system) alarm (buzzer)		External warning lamp (option)	Voice alarm (option)	Remarks
			Graphic display message	Display LCD flashing	Setting SW LED Lighting /flashing	Loud alarm	Low alarm			
Operation range/limit	Right swing limit	Warning (less 15 degrees)	Caution ! right swing	—	Flashing (red)	—	Intermittent (twice/second)	—	Stop swing operation	Buzzer/alarm output only when right swing operation
		Warning (less 8 degrees)					Intermittent (four times/second)			
		Alarm	Warn ! right swing	—	Lighting (red)	—	Continuous	—	Danger ! Stop swing operation	
Release of automatic stop				—	—	—	—	Red		
Release of automatic stop is prohibited			Warn ! ML override	—	—	—	Continuous	Red		Buzzer/alarm sound only when releasing automatic stop
Outrigger operation is prohibited			Warn ! outrigger	—	—	—	Continuous	—		Outrigger can not be operated if the machine can turn over backward when retracting or spreading outrigger
Operating conditions	When setting outrigger		Outrigger manual set	—	—	—	—	—		
	Checking for operation mode combination		(See crane installation mode)	—	—	—	Continues for 2seconds	—	Set outrigger	Outrigger display on the moment limiter (overload preventive system) display returns to the mode before setting
	T/M N checking		(See crane installation mode)	—	—	—	Continues for 2seconds	—	Set outrigger	Buzzer sounds if transmission shift is other than "N" when setting operating conditions for outrigger
	Operating conditions are not set		(See crane installation mode)	—	—	—	Continues for 2seconds	—	Set outrigger	
	Check mode		All lamps light up for 3 seconds → All lamps turn off for 1 seconds	—	—	—	All lamps light up for 3 seconds → All lamps turn off for 1 seconds			Screen returns to normal display after 4 seconds
Neutral safety			Neutral safety	—	—	—	Continues for 2seconds	—		
Accumulator pressure drop			Accumulator Lower	—	—	—	—	—		Monitor buzzer sounds (PORO-PORP sound)
Operating temperature of hydraulic oil: 70 degrees or higher			Hyd. temp. 70°C	—	—	—	—	—		
Overrun			Overrun	—	—	—	—	—		Monitor buzzer sounds (PORO-PORP sound)
ERR output	OSS error (PTO WORK 1 & 2)		OSS error EXX (XX: error number)	—	—	Intermittent (once/second)	—	—		When moment limiter (overload preventive system) sensor system error outputs, all display LCDs are turned off. When other errors output, the LCD display functions correctly

Warning/alarm output / Condition		 AD60671B	 AD60672B		Moment limiter (overload preventive system) alarm (buzzer)		External warning lamp (option)	Voice alarm (option)	Remarks
		Graphic display message	Display LCD flashing	Setting SW LED Lighting /flashing	Loud alarm	Low alarm			
ERR output	MDT error	MDTU error EXX (XX: error number)	—	—	Intermittent (once/second)	—	—		When operating boom/single-top, jib error is not displayed
ERR output	ATM error (PTO RUN & WORK 1)	ATM error EXX (XX: error number)	—	—	Intermittent (once/second)	—	—		
ERR output	Emergency stop mode	** error EXX	—	—	Continuous	—	—	Danger	
Boom extend and retract error		Caution ! Boom extend	—	—	—	Continues for 2 seconds	—		
Lever stand lowering		Control lever lower	—	—	—	—	—		
Preparation mode	Boom length ≧ 11.6 m	Retract Boom	—	—	—	—	—		Message appears only in preparation mode
Preparation mode	Boom angle ≧ 30°	Lower Boom	—	—	—	—	—		Message appears only in preparation mode
Jib harness connection, + 11.6 m or more (boom length)		Check jib harness	—	—	—	—	—		Message is not displayed in preparation mode and is displayed except preparation

AUTOMATIC STOP TABLE

The machine or work equipment automatically stops depending on the following causes and operating conditions.

Causes		Operating conditions	Work equipment operation	Main/Unload ○: Powered (when operation) ×: Non-powered (when stopping operation)										Automatic stop releasing	PPC unload jib lowering	T/M shift position	Remarks
				Boom lifting and lowering		Boom extending and retracting		Main winch		Auxiliary winch		Jib derricking					
				Lifting	Lowering	Extending	Retracting	Hoisting	Lowering	Hoisting	Lowering	Lifting	Lowering				
Overload (Danger angle for turnover) (Over-tension)		Load factor ≧ 100% or Boom angle ≦ danger angle for turnover or Tension (= Wa/N) > line pull limit	○	×	×	○	×	○	×	○	○	×	Available	×		
Overwinding		Overwinding L/S: OPEN	○	×	×	○	×	○	×	○	○	×	Available	×		
Boom angle upper limit		Boom angle ≧ 81.5° Boom lifting and lowering cylinder stroke end	×	○	○	○	○	○	○	○	○	○	Available	○		
Jib angle to ground limit		Jib angle to ground when operating jib ≦ 0°	○	×	○	○	○	○	○	○	○	×	Available	×		
Jib tilt angle limit (only for power tilt specification machine)		Jib tilt when operating jib < 5°	○	○	○	○	○	○	○	○	×	○	Available	○		
		Jib tilt when operating jib > 61°	○	○	○	○	○	○	○	○	○	×	Available	×		
Operating range limit	Operating radius	Actual operating angle ≧ set value	○	×	×	○	○	○	○	○	○	×	Available	×		Automatic stop is not available.
	Lifting height	Actual lifting height ≧ set value	×	○	×	○	○	○	○	○	×	○				
	Boom angle upper limit	Actual boom angle ≧ set value	×	○	○	○	○	○	○	○	○	○				
	Boom angle lower limit	Actual boom angle ≦ set value	○	×	○	○	○	○	○	○	○	○				
	Left swing	Actual swing angle ≧ set value (for left swing)	○	○	○	○	○	○	○	○	○	○				
	Right swing	Actual swing angle set value (for right swing)	○	○	○	○	○	○	○	○	○	○				
Operation mode limit		1. Incorrect operating mode combination is detected 2. Insufficient checking for operating mode combination	○	×	×	○	×	○	×	○	○	×	Available	×		
		Operation conditions are not set In case that outrigger is set under conditions; 1. PTO RUN → PTO WORK 1 & 2 2. Outrigger operation is detected 3. Outrigger error (emergency is not set) is displayed 4. Carrier operating mode is changed 5. T/M neutral setting is insufficiently checked	○	○	○	○	○	○	○	○	○	×	Available	×		By minimum overload conditions (rated net load on a side when traveling with lifting load on tire), the machine stops automatically
		Carrier operation mode: outrigger	○	○	○	○	○	○	○	○	○	○	Available	○	N	
		Carrier operation mode: on tire stationary	○	○	○	○	○	○	○	○	○	○	Available	×	N	
		Carrier operation mode: traveling with lifting load	○	○	○	○	○	○	○	○	○	○	Available	×		To prevent jib damage due to incorrect operation when stowing jib, the machine stops automatically

Causes	Operating conditions	Work equipment operation	Main/Unload ○: Powered (when operation) ×: Non-powered (when stopping operation)										Automatic stop releasing	PPC unload jib lowering	T/M shift position	Remarks
			Boom lifting and lowering		Boom extending and retracting		Main winch		Auxiliary winch		Jib derricking					
			Lifting	Lowering	Extending	Retracting	Hoisting	Lowering	Hoisting	Lowering	Lifting	Lowering				
Operation mode limit	Crane operating mode: boom		○	○	○	○	○	○	○	○	○	○	Available	×		To prevent jib damage due to incorrect operation when stowing jib, the machine stops automatically
	Crane operating mode: single top		○	○	○	○	○	○	○	○	○	○	Available	×		To prevent jib damage due to incorrect operation when stowing jib, the machine stops automatically
	Crane operating mode: jib extending		○	○	×	○	○	○	○	○	○	○	Available	○		Automatic stop due to overwinding is not available
	Crane operating mode: jib first and second stages		○	○	○	○	○	○	○	○	○	○	Available	○		
	Carne operating mode: outrigger/on-tire stationary → Travel with lifting load		○	○	○	○	○	○	○	○	○	○	Available	×	N safety	
	Crane operating mode: outrigger/on-tire stationary → PTO "RUN"														N safety	When PTO SW is set to "RUN" mode, moment limiter system (overload preventive system) does not function. All display LCDs go off.
	Displayed mode checking		○	×	×	○	×	○	×	○	×	×	Available	○		
Traveling by lever stand	Lever stand L/S: "OFF"		×	×	×	×	×	×	×	×	×	×	Not available	×		When the machine is traveling with lever stand "LOWERING", always operating conditions are set to unload. (PPC, unload solenoid, jib operation, etc. are not displayed)
OSS error	E1X – E9X		○	×	×	○	×	○	×	○	○	×	Available	×		When boom/single-top operation mode is selected, jib error is not displayed (and the machine does not stop automatically).
MDT error	Outrigger error		○	×	×	○	×	○	×	○	○	×	Available	×		Unless carrier operating mode: "OUTRIGGER" is selected in moment limiter (overload preventive system), the machine does not stop automatically. Outrigger. emergency setting releases automatic stop
Error	Emergency stop mode		○	×	×	○	×	○	×	○	○	×	Available	×		When PTO SW is set "WORK 1 & 2", inputting "x" cause automatic stop.

12.35.7 MOMENT LIMITER (overload prevention system)

Check MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) operation as following procedures.

1. Turn the starting key ① to "START" position and start the engine.

2. Set PTO switch ② to the "WORK 1" position. Power of MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) switch turns ON.
   - When the PTO switch is set to the "WORK 1" position, the ALARM buzzer (PEE sound) sounds for two or three seconds.)

3. Set the crane operating mode switch to "Boom" and the carrier operating mode switch to "Outrigger".

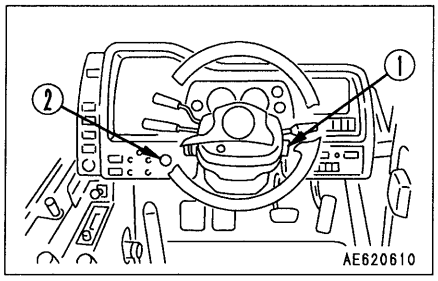
4. Slide the outrigger to the desired length and insert the lock pin.

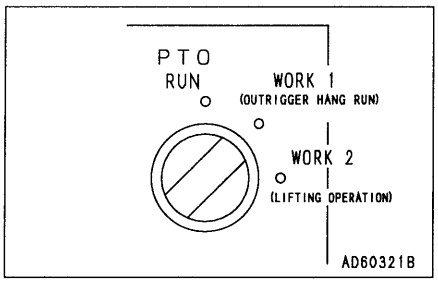
5. Follow the below items to check the outrigger extending width setting function.
   - Make sure that the lock pin position matches with the contents of the display on the panel.

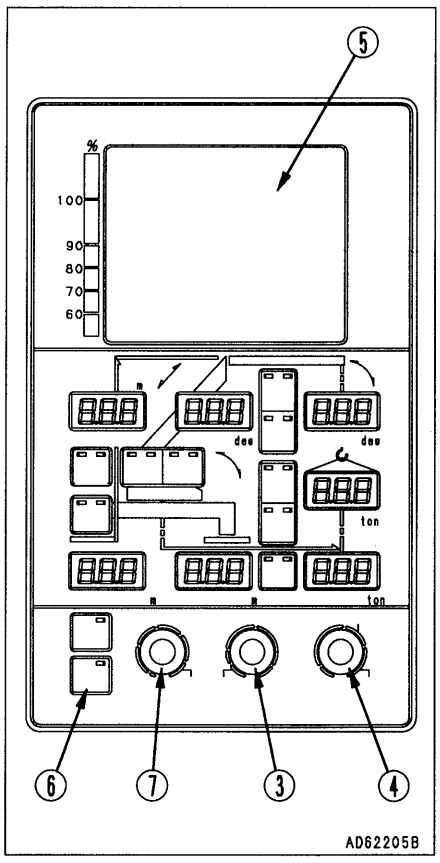
6. Check the outrigger setting by pressing the "SET" switch.

7. Check the wire rope hook number setting by pressing the "SET" switch.
   - For the items 6 and 7, when the "Setting" switch is pressed, the ALARM buzzer (PEE sound) sounds.

8. To check the automatic stop function, set the display mode switch to the "CHECK" position, and operate the below levers to check the following items.
   1) When the switch is set to "Check", all display area of the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel light up and buzzer sounds, then all lit up area go out and the buzzer stops. After that (3 – 5 seconds later), the display returns to normal.
   2) Check the "Name of machine", "Outrigger type" and "Jib specification" displayed on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel.
   3) The boom does not go down even when the boom hoist lever is operated.
   4) The boom does not extend even when the boom telescope lever is operated.
   5) The winch does not wind in even when the winch control lever is operated.
   6) The tilt does not down even when the auxiliary jib hoist lever is operated.
      (Only for the power tilt jib type machine : Mount the jib before carry out the jib working.)







REMARK

For items 3), 4), 5) and 6), operation to the reverse direction (safe side) is possible.

7) Check that the display area of the MOMENT LIMITER (OVER-LOAD PREVENTION SYSTEM) control panel is synchronized with the lever operation and is reversely displayed when operating each levers.
8) Check that the overwinding is reversely displayed when overwinding.
9) Check that the "Top Retract" stowing is normally displayed when extending the boom telescope cylinder.
10) Check that the automatic stop cancel is reversely displayed when canceling the automatic stop.

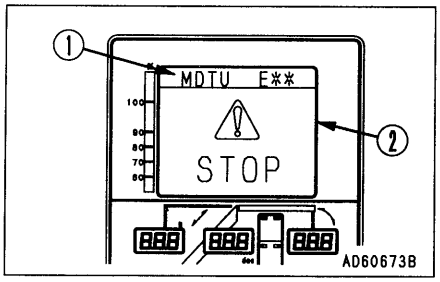
9. Set the display mode switch to "SWING" and use the following procedure to check that the display values of each sensors are normal.
   1) Check that the swing position display on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel matches with the machine condition when swinging. And when in front, check that the front position is displayed.
   2) Check that the boom length display value is [7.6m (24 ft 11 in)] when the boom length is at the minimum.
   3) Check that the boom length display value is [32.0m (104 ft 11 in)] when the boom length is at the maximum.
      After ensuring the items 2) and 3) move down the boom at the proper angle and length, and stop to operate. (At this point, do not stop automatically with overloading.)
   4) Wind in the auxiliary hook to just before the overwind position, wind out the main hook to just before the grounding position, and check that the actual load weight display value is [0.2 $\pm^{0.2}_{0.0}$ ton] = main hook when without loading.

10. If the above items can not be checked, or the displayed value is out of the standard value, contact your Komatsu or Komatsu distributor.

12.35.8 ERROR CODE DISPLAY AND METHOD OF CHECKING

⚠ CAUTION

If STOP mark ⚠ ② appears on display, controller can not function correctly and this could cause a serious accident. Immediately stop the machine traveling and operation and find the cause. Then consult Komatsu or your Komatsu distributor to check your machine.



Each time self-diagnostic detects any error, an error code "E**" is displayed on the graphic display ① of Moment Limter (Overload preventive System) panel.

If an error code is displayed, record the related error content and consult our company or our distributor for checking and inform us that error code (displayed on the graphic display).

- When error occurs, the related error code and fault system are displayed on the upper part ① of the graphic dislay.

  Unit to be displayed
  MDTU: Crane MDT
  MDYL: Carrier MDT
  OSS: Moment Limiter (Overload Prevention System)
  ATM: T/M Controller

12.35.9 BACKWARD STABLE STOP

⚠ CAUTION

Is the moment limter (overload prevention system) displays the following errors;
"OSS error E41" --- Abnormality in the boom angle sensor
"Oss error E43" --- Abnormality in the boom length sensor
The automatic backward stable stop cannot be operated because abnormalities are present in the boom sensor.

If the boom length is shortened and the boom is raised, the machine may turn over because the boom weight has been moved backward. Take care especially when the outriggers are not used. For this reason, boom raising and retracting are limited, and if the operation exceeds this limitation, the machine stops automatically.

In addition, when the operation exceeds the limitation, if the moment limiter (overload prevention system) is cancelled, the machine remains stopped.

REMARK

When the machine stops automatically, lower the boom or extend the boom for safety.

NOTICE

When stowing away the outriggers, always position the work equipment to the traveling posture.

METHOD OF CHECKING ERROR CODE

Error code display		Error content	Error actual remedy
MDTU error	E00	System error	As impossible to remedy, stop traveling and operation.
MDTU error	E10	Shutdown at low voltage	As impossible to remedy, stop traveling and operation.
MDTU error	E11	Shutdown at high temperature	As impossible to remedy, stop traveling and operation.
MDTU error	E20	Abnormality in selecting Upper and Low	As impossible to remedy, stop traveling and operation.
MDTU error	E21	Abnormality in selecting Upper and Low	As impossible to remedy, stop traveling and operation.
MDTU error	E24	Abnormality in Model selection	As impossible to remedy, stop traveling and operation.
MDTU error	E25	Abnormality in Model selection	As impossible to remedy, stop traveling and operation.
MDTU error	E28	Abnormality in C-NET (Communication between MDTs)	As impossible to remedy, stop traveling and operation.
MDTU error	E29	Abnormality in S-NET (Communication between Moment Limiters (Overload Preventive System))	As impossible to remedy, stop operation.
MDTU error	E40	Short circuit with ground in Swing Flasher output	As Swing Flasher does not flash, move the machine to a safe place and stop operation.
MDTU error	E41	Short circuit with ground in Power Supply for Outrigger panel	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTU error	E43	Short circuit with ground in Power Supply for Outrigger mode	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTU error	E4C	Short circuit with ground in Main Winch Buzzer	As Main Winch Buzzer does not sound, move the machine to a safe place and stop operation.
MDTU error	E4D	Short circuit with ground in Emergency Alarm Buzzer	As Emergency Alarm Buzzer does not sound, move the machine to a safe place and stop operation.
MDTU error	E4E	Short circuit with ground in Auxiliary Winch Buzzer	As Auxiliary Winch Buzzer does not sound, move the machine to a safe place and stop operation.
MDTU error	E4F	Short circuit with ground in Monitor Concentrated Buzzer	As Monitor Concentrated Buzzer does not sound, move the machine to a safe place and stop operation.

Error code display		Error content	Error actual remedy
MDTU error	E80	Hot short circuit in Swing Flasher output	As Swing Falsher does not stop, move the machine to a safe place and stop operation.
MDTU error	E81	Hot short in Power Supply for Outrigger Panel	As both buzzer and alarm do not sound and secondary error can not be detected, stop operation.
MDTU error	E83	Hot short in Power Supply for Outrigger mode	As Automatic Stop works even though the machine can be turned over to backward when retracting or extending outrigger, stop operation.
MDTU error	EE0	PTO mode does not match	As impossible to remedy (the machine is set to PTO operation 1), stop traveling and operation.
MDTU error	EE1	Abnormlity in 4WD Signal	As impossible to remedy (the machine is set to 4WD Hi), stop traveling.
MDTU error	EE3	Abnormality in Service Brake input	As both Service and Auxiliary Brakes are applied or not applied at the same time, stop operation.
MDTU error	EE4	Abnormality in Suspension Lift Switch	As Suspension Lift is disable, stop operation.
MDTU error	EE5	Outrigger Switch Abnormality/ input	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTU error	EE6	Jack Slide simultaneous input	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTU error	EE6	Outrigger extend and retract simultaneous input	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTU error	EEA	Steering mode abnormal input	Move the machine to a safe place while locking rear steering and and then stop traveling.
MDTU error	EEC	Rear steering lock free simultaneous input	Move the machine to a safe place while locking rear steering and then stop traveling.

Error code display		Error content	Error actual remedy
MDTL error	E00	System error	As impossible to remedy, stop traveling and operation.
MDTL error	E10	Shutdown at low voltage	As impossible to remedy, stop traveling and operation.
MDTL error	E11	Shutdown at high temperature	As impossible to remedy, stop traveling and operation.
MDTL error	E20	Abnormality in selecting Upper and Low	As impossible to remedy, stop traveling and operation.
MDTL error	E21	Anbormality; Upper and Low	As impossible to remedy, stop traveling and operation.
MDTL error	E24	Abnormality in Model selection	As impossible to remedy, stop traveling and operation.
MDTL error	E25	Abnormality in Model selection	As impossible to remedy, stop traveling and operation.
MDTL error	E28	Abnormlity in C-NET (Communication between MDTs)	As impossible to remedy, stop traveling and operation.
MDTL error	E29	Abnormality in S-NET (Communication between ATMs)	Stop traveling. If the machine will not stop, move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E40	Short circuit with ground in Outrigger Jack RL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E41	Short circuit with ground in Outrigger Jack FL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E42	Short circuit with ground in Outrigger Jack RR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E43	Short circuit with ground in Outrigger Jack FR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E44	Short circuit with ground in Outrigger Slide RL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.

Error code display		Error content	Error actual remedy
MDTL error	E45	Short circuit with ground in Outrigger Slide FL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E46	Short circuit with ground in Outrigger Slide RR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E47	Short circuit with ground in Outrigger Slide FR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E48	Short circuit with ground in Outrigger Selector extend	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E49	Short circuit with ground in Outrigger retract	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	E4A	Short circuit with ground in Rear Steering lock SOL	As Rear steering lock is disable, move the machine to a safe place and stop operation.
MDTL error	E4B	Short circuit with ground in Rear Steering free SOL	As Rear steering lock is disable, move the machine to a safe place and stop operation.
MDTL error	E4C	Short circuit with ground in Service Brake	As Auxiliary Brake is disable, move the machine to a safe place and stop operation.
MDTL error	E4D	Short circuit with ground in Exhaust Brake	As Exhaust Brake is disable, move the machine to a safe place and stop operation.
MDTL error	E4E	Short circuit with ground in Retarder	As Retarder Brake is disable, move the machine to a safe place and stop operation.
MDTL error	E4F	Short circuit with ground in Pre-heater	As Pre-heater is disable, stop the machine promptly when using Pre-heater.
MDTL error	E5A	Short circuit with ground in Head Lamp Hi	As High Beam is disable, move the machine by Low-beam to a safe place and stop operation. If can not operate both lamps, stop traveling.
MDTL error	E5B	Short circuit with ground in Head Lamp Lo	As Low beam is disable, move the machine to a safe place and stop traveling.
MDTL error	E5C	Short circuit with ground in Small Lamp	As Small Lamp is disable, move the machine to a safe place and stop traveling.
MDTL error	E5D	Short circuit with ground in Service Lamp	As Service Lamp is disable, move the machine to a safe place and stop traveling.

Error code display		Error content	Error actual remedy
MDTL error	E5E	Short circuit with ground in Turn R	As can not operate Turn Signal. Move the machine to a safe place and stop traveling.
MDTL error	E5F	Short circuit with ground in Turn L	As can not operate turn signal, move the machine to a safe place and stop traveling.
MDTL error	E60	Short circuit with ground in S/T mode SOLA	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E61	Short circuit with ground in S/T mode SOLC	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E62	Short circuit with ground in S/T mode SOLB	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E63	Short circuit with ground in S/T mode SOLD	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E64	Short circuit with ground in Pump junction SOL	As speed is lower when outrigger full operating, move the machine to a safe place and stop operation.
MDTL error	E65	Short circuit with ground in Pressure Sensor	As outrigger automatic extend in horizontal direction and axial force alarm are disabled, stop operation.
MDTL error	E67	Short circuit with ground in Suspension Lift SOL	As Suspension Lift is disabled, stop operation.
MDTL error	E76	Short circuit with ground in Power Supply for Length Sensor	As outrigger setting is disabled, perform emergency setting. If both setting are disabled, stop operation.
MDTL error	E80	Hot short in Outrigger Jack RL	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E81	Hot short in Outrigger Jack FL	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E82	Hot short in Outrigger Jack RR	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E83	Hot short in Outrigger Jack FR	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E84	Hot short in Outrigger Slide RL	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.

Error code display		Error content	Error actual remedy
MDTL error	E85	Hot short in Outrigger Slide FL	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E86	Hot short in Outrigger Slide RR	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E87	Hot short in Outrigger Slide FR	As Suspension Lift is disabled and Outrigger extend and retract are abnormal, move the machine to a safe place and stop operation.
MDTL error	E88	Hot short in Outrigger	As abnormalities in steering operation, Suspension Lift and Outrigger extend and retract occur, immediately stop traveling. In this case, emergency steering can be operated but never operate it.
MDTL error	E89	Hot short in Outrigger	As abnormalities in steering operation, Suspension Lift and Outrigger extend and retract occur, immediately stop traveling. In this case, emergency steering can be operated but never operate it.
MDTL error	E8A	Hot short in rear steering lock SOL	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E8B	Hot short in rear steering free SOL	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	E8C	Hot short in Service Brake	As Auxiliary Brake is disabled, move the machine to a safe place and stop traveling.
MDTL error	E8D	Hot short in Exhaust Brake	As Exhaust Brake is disabled, move the machine to a safe place and stop traveling.
MDTL error	E8E	Hot short in Retarder	As Retarder Brake is disabled, move the machine to a safe place and stop traveling.
MDTL error	E8F	Hot short in Pre-heater	As exhaust smoke abnormality and power reduction occur when continuing pre-heating, stop traveling.
MDTL error	E9A	Hot short in Head Lamp Hi	As High Beam Lamp continues lighting, move the machine to a safe place and stop traveling.
MDTL error	E9B	Hot short in Head Lamp Lo	As Low Beam Lamp continues lighting, move the machine to a safe place and stop traveling.

Error code display		Error content	Error actual remedy
MDTL error	E9C	Hot short in Small Lamp	As Small Lamp continues lighting, move the machine to a safe place and stop traveling.
MDTL error	E9E	Hot short in Turn R	As Turn Signal continues moving, move the machine to a safe place and stop traveling.
MDTL error	E9F	Hot short in Turn L	As Turn Signal continues moving, move the machine to a safe place and stop traveling.
MDTL error	EA0	Hot short in S/T mode SOLA	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EA1	Hot short in S/T mode SOLC	Move the machine to a safe place by two-front-wheel steering while locking rear steering and stop traveling.
MDTL error	EA2	Hot short in S/T mode SOLB	Move the machine to a safe place by two-front-wheel steering while locking rear steering and stop traveling.
MDTL error	EA3	Hot short in S/T mode SOLD	Move the machine to a safe place by two-front-wheel steering while locking rear steering and stop traveling.
MDTL error	EA4	Hot short in Pump junction SOL	As Swing operation is disable, stop operation.
MDTL error	EA7	Hot short in Suspension Lift SOL	As Outrigger extend is disable, stop operation.
MDTL error	EB0	Discontinuity in Outrigger Jack RL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB1	Discontinuity in Outrigger Jack FL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB2	Discontinuity in Outrigger Jack RR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB3	Discontinuity in Outrigger Jack RL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both outriggers, stop operation.
MDTL error	EB4	Discontinuity in Outrigger Slide RL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB5	Discontinuity in Outrigger Slide FL	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.

Error code display		Error content	Error actual remedy
MDTL error	EB6	Discontinuity in Outrigger Slide RR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB7	Discontinuity in Outrigger Slide FR	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB8	Discontinuity in Outrigger	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EB9	Discontinuity in Outrigger Selector retract	As can not operate Upper Outrigger, operate Lower Outrigger. If can not operate both Outriggers, stop operation.
MDTL error	EBA	Discontinuity in Rear steering	As rear steering lock is disabled (free is disabled when locking), move the machine to a safe place and stop traveling.
MDTL error	EBB	Discontinuity in Rear steering free SOL	As rear steering free is disabled, travel to the safe place and stop the machine.
MDTL error	EBC	Discontinuity in Service Brake	As Auxiliary Brake is disabled, move the machine to a safe place and stop traveling.
MDTL error	EBD	Discontinuity in Exhaust Brake	As Exhaust Brake is disabled, move the machine to a safe place and stop traveling.
MDTL error	EBF	Discontinuity in Pre-heater	As Pre-heater is disabled, immediately stop traveling when using Pre-heater.
MDTL error	ECA	Discontinuity in Head Lamp Hi	As High Beam Lamp is disabled, move the machine with Low beam. If can not operate both Lamps, stop traveling.
MDTL error	ECB	Discontinuity in Head Lamp Lo	As Low Beam Lamp is disabled, move the machine to a safe place and stop traveling
MDTL error	ECC	Discontinuity in Small Lamp	As Small Lamp is disabled, move the machine to a safe place and stop traveling.
MDTL error	ECE	Discontinuity in Turn R	As Turn Signal is disabled, move the machine to a safe place and stop traveling.
MDTL error	ECF	Discontinuity in Turn L	As Turn Signal is disabled, move the machine to a safe place and stop traveling.
MDTL error	ED0	Discontinuity in S/T mode SOLA	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.

Error code display		Error content	Error actual remedy
MDTL error	ED1	Discontinuity in S/T mode SOLC	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	ED2	Discontinuity in S/T mode SOLB	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	ED3	Discontinuity in S/T mode SOLD	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	ED4	Discontinuity in Pump junction SOL	As speed is lower when outrigger full operating, move the machine to a safe place and stop operation.
MDTL error	ED7	Discontinuity in Suspension Lift SOL	As Suspension Lift is disabled, stop operation.
MDTL error	EE7	Hot short in Outrigger	As steering operation is disabled, immediately stop traveling. In this case, emergency steering can be operated but never operate it.
MDTL error	EE8	Short circuit with ground and discontinuity in Outrigger Operation Signal	As both buzzer and alarm do not sound and secondary error can not be detected, stop operation.
MDTL error	EE9	Discontinuity in Fuel Sensor	As Fuel level is not checked, move the machine to a safe place and stop traveling.
MDTL error	EEB	Abnormality in Rear steering L/S combination	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EEE	Abnormality in both Speed Sensors	As Speedometer is disabled, move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EEF	Abnormality in Speed Sensor	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EF0	Emergency stop due to abnormality in Special steering	Immediately stop traveling. Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EF1	Emergency stop due to abnormality in Reverse steering	Immediately stop traveling. Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EF2	Abnormality in Special steering	Move the machine to a safe place by two-front-wheel steering while locking rear steering and then stop traveling.
MDTL error	EF3	Abnormality in Reverse steering: maintaining normal steering	Move the machine to a safe place by normal steering and then stop traveling.

Error code display		Error content	Error actual remedy
MDTL error	EF4	Abnormality in Reverse steering: maintaining reverse steering	Immediately stop traveling. Move the machine to a safe place by normal steering and then stop traveling.
MDTL error	EFE	Abnormality in Turn R	As Turn Signal functions incorrectly or can not function, move the machine to a safe place and stop traveling.
MDTL error	EFF	Abnormality in Turn L Signal	As Turn Signal functions incorrectly or can not function, move the machine to a safe place and stop traveling.

Error code display		Error content	Error actual remedy
OSS error	E00	Abnormality in panel communication	As operation mode can not be selected, stop operation.
OSS error	E01	Panel System error	As operation mode is can not be selected, stop operation.
OSS error	E02	Abnormality in Panel Rotary Switch	As operation mode can not be selected, stop operation.
OSS error	E10	Moment Limiter (overload preventive system) System error	As impossible to remedy, stop operation.
OSS error	E20	Abnormality in S-NET (communication between MDTs)	As impossible to remedy, stop operation.
OSS error	E21	Abnormality in Outrigger Length Sensor FL	As impossible to set Outrigger, use emergency setting mode. If impossible to use both setting, move the machine to a safe place and then stop operation.
OSS error	E22	Abnormality in Outrigger Length Sensor FR	As impossible to set Outrigger, use emergency setting mode. If impossible to safe place and then stop operation.
OSS error	E23	Abnormality in Outrigger Length Sensor RL	As impossible to set Outrigger, use emergency setting mode. If impossible to use both setting, move the machine to a safe place and then stop operation.
OSS error	E24	Abnormality in Outrigger Length Sensor RR	As impossible to set Outrigger, use emergency setting mode. If impossible to use both setting, move the machine to a safe place and then stop operation.
OSS error	E30	Abnormality Jib Transmission Module	As impossible to operate Jib, stop operation.
OSS error	E31	Abnormality in Tilt Angle Sensor	As Jib operation is impossible and Jib Tilt Angle can not be detected, stop operation.
OSS error	E41	Abnormality in Boom Angle Sensor	As Jib operation is impossible and Boom Angle and Sling Load can not be detected, stop operation.
OSS error	E43	Abnormality in Boom Length Sensor	As Boom operation is impossible and Boom Angle and Sling Load can not be detected, stop operation.
OSS error	E44	Abnormality in Bottom Pressure Sensor	As Boom operation is impossible and Sling Load can not be detected, stop operation.
OSS error	E45	Abnormality in Head Pressure Sensor	As Boom operation is impossible and Sling Load can not be detected, stop operation.

Error code display		Error content	Error actual remedy
OSS error	E46	Abnormality in Swing Angle Sensor	As Boom operation is impossible and Swing location can not be detected, stop operation.
OSS error	E48	Reverse of axial force of Derrick Cylinder	As Boom Derrick Cylinder stroke end and Boom operations are impossible and Sling Load can not be detected, stop operation
OSS error	E50	Short circuit with ground in Main Unload SOL	As impossible to operate Work Equipment, stop operation.
OSS error	E51	Short circuit with ground in PPC Unload SOL	As impossible to operate Jib Tilt, stop operation.
OSS error	E52	Short circuit with ground in Jib Extend/Retract selector SOL	As impossible to operate Top Side Extend/Retract Cylinder, stop operation.
OSS error	E53	Short circuit with ground in Release Disable Relay for Auto Stop	When keeping to Auto Stop released, move the machine to a safe place and stop. operation. In this case, Work Equipment can be operated while setting lever stand to Derrick. Backward Stability Stop can be also released.
OSS error	E54	Short circuit with ground in Power Supply for High Speed Winch	As impossible to operate High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E55	Short circuit with ground in Main Winch High Speed SOL	As impossible to operate Main High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E56	Short circuit with ground in Auxiliary Winch High Speed SOL	As impossible to operate Auxiliary High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E57	Short circuit with ground in Winch High Speed Relay	As impossible to operate High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E58	Short circuit with ground in Jib Rotate/Fold Relay	As impossible to operate Jib Rotate/Fold, stop operation.
OSS error	E59	Short circuit with ground in Jib Rotation Enable Relay	As impossible to operate Jib Rotate/Fold, stop operation.
OSS error	E5A	Short circuit with ground in Audio Alarm Trigger	As impossible to operate Audio Alarm, stop operation.
OSS error	E5B	Short circuit with ground in Power Supply for Audio Alarm	As impossible to operate Audio Alarm, stop operation.
OSS error	E5C	Short circuit with ground in Buzzer for Moment Limiter (overload prevention system)	As Moment Limiter (overload prevention system) Buzzer does not sound, stop operation.
OSS error	E5D	Short circuit with ground in Emergency Alarm Buzzer	As Emergency Alarm Buzzer does not sound, stop operation.
OSS error	E68	Short circuit with ground in 10 V Power Supply	As Boom operation is impossible and Swing Load can not be detected, stop operation.

Error code display		Error content	Error actual remedy
OSS error	E6A	Short circuit with ground in 15 V Power Supply	As Boom operation is impossible and Swing Load can not be detected, stop operation.
OSS error	E70	Hot short in Main Unload SOL	As Moment Limiter (overload prevention system) Auto Stop is disable, stop operation.
OSS error	E71	Hot short in PPC Unload SOL	As Moment Limiter (overload prevention system) Auto Stop is disable (for Jib tilting only), stop operation.
OSS error	E72	Hot short in Jib Extend/Retract selector SOL	As impossible to operate Second Side Extend/Retract Cylinder, stop operation.
OSS error	E73	Hot short in Release Disable Relay for Auto Stop	As impossible to release Auto Stop, stop operation.
OSS error	E75	Hot short in Main Winch High Speed SOL	As impossible to operate Main High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E76	Hot short in Auxiliary Winch High Speed SOL	As impossible to operate High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E77	Hot short in Winch High Speed Relay	As impossible to operate High Speed Winch, move the machine to a safe place and stop operation.
OSS error	E78	Hot short in Jib Rotate/Fold Relay	As impossible to operate Jib, stop operation.
OSS error	E79	Hot short in Jib Rotation Enable Relay	As impossible to operate Jib Rotate/Fold, stop operation.
OSS error	E88	Discontinuity in Main Unload SOL	As Auto Stop continues, stop operation.
OSS error	E89	Discontinuity in PPC Unload SOL	As Auto Stop continues, stop operation
OSS error	E8A	Discontinuity in Jib Extend/ Retract selector SOL	As impossible to operate Top Side Extend/ Retract Cylinder, stop operation.
OSS error	E8B	Discontinuity in Release Disenable Relay for Auto Stop	When keeping to Auto Stop released, move the machine to a safe place and stop operation. In this case, Work Equipment can be operated while setting lever stand to Tilt. Backward Stability Stop can be also released.
OSS error	EA0	Abnormality on Forward L/S	As Load Table is not displayed when traveling using Sling and on-tire, move the machine to a safe place and stop operation.
OSS error	EA1	Top Boom retracting L/S	As Boom retracting is incorrect and rated load is limited, stop operation.
OSS error	EA2	Abnormality in Boom Selector SW	As Manual Extend/Retract is incorrect, stop operation.

Error code display		Error content	Error actual remedy
OSS error	EA3	Hot short in Left Lock Pin Input	As Jib Extend/Retract is incorrect, move the machine to a safe place and stop operation.
OSS error	EA4	Abnormality in Winch High Speed SW	As impossible to operate High Speed Winch, move the machine to a safe place and stop operation.
OSS error	EA5	Abnormality in PTO SW	As impossible to remedy (controller is set to PTO work 1), stop operation.
OSS error	EA6	H/X Select does not match	As impossible to remedy (controller is set to X), stop operation.
OSS error	EA7	Spec Selector Rotary SW out of set value	As impossible to remedy, stop operation.
OSS error	EA8	Short circuit with ground in PPC Press SW; Boom Raise	As impossible to use Auto Stop, stop operation.
OSS error	EA9	Short circuit with ground in PPC Press SW; Boom Lower	As impossible to use Auto Stop, stop operation.
OSS error	EAA	Short circuit with ground in PPC Press SW; Boom Extend	As impossible to use Auto Stop, stop operation.
OSS error	EAB	Short circuit with ground in PPC Press SW; Boom Retract	As impossible to use Auto Stop, stop operation.
OSS error	EAC	Short circuit with ground in PPC Press SW; Jib Derrick	As impossible to use Auto Stop, stop operation.
OSS error	EAD	Short circuit with ground in PPC Press SW; Jib Tilt	As impossible to use Auto Stop, stop operation.
OSS error	EB0	Simultaneous input of PPC Press SWs; Boom Araise and lower	As impossible to return to Auto Stop, stop operation.
OSS error	EB1	Simultaneous input of PPC Press SWs; Boom Extend and Retract	As impossible to return to Auto Stop, stop operation.
OSS error	EB2	Simultaneous input of PPC Press SWs; Jib Derrick and Tilt	As impossible to return to Auto Stop, stop operation.
OSS error	EB3	Simultaneous input of PPC Press SWs; Swing Left and	As impossible to return to Auto Stop, stop operation.
OSS error	EB4	Simultaneous input of PPC Press SWs; Main Winch	As impossible to return to Auto Stop, stop operation.
OSS error	EB5	Simultaneous input of PPC Press SWs; Auxiliary Winch	As impossible to return to Auto Stop, stop operation.

OSS errors EB1 – EB5 appear when manipulating the work equipment operating lever and work equipment operating pedal simultaneously in the opposite direction each other.

OSS error EB1 appears when depressing the pedal to use Boom Extend and manipulating the operating lever to use Boom Retract simultaneously and vice versa while setting the pedal selector switch to Boom Extend and Retract.

OSS error EB5 is displayed when depressing the pedal to use Lift and manipulating the operating lever to Lower simultaneously and vice versa while setting the pedal selector switch to Auxiliary Winch.

⚠ CAUTION

- **Never manipulate work equipment operating lever and pedal simultaneously in the opposite direction each other. Work equipment may move or the other direction in one. Therefore, such manipulation could cause serious danger.**
- **When OSS error E41 and E43 are displayed, the backward stable automatic stop is not executed.**
  But, at this time, take care that the outrigger can be operated.

Error code display		Error content	Error actual remedy
ATM error	E11	Discontinuity in Tachometer Sensor	As Auto Speed Control is incorrect, move the machine to a safe place and stop operation.
ATM error	E12	Discontinuity in Speed Sensor 1	As both Buzzer and Alarm do not sound, stop traveling before emergency stop due to secondary error.
ATM error	E13	Discontinuity in Speed Sensor 2	As Buzzer and Alarm do not sound, stop traveling before emergency stop due to secondary error.
ATM error	E14	Discontinuity in Accelerator Potentiometer	As Auto Speed Control is incorrect, move the machine to a safe place and stop operation.
ATM error	E17	Discontinuity in Shift Lever	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.
ATM error	E18	Discontinuity in FR Signal for interlock	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.
ATM error	E19	No input to SOL power supply monitor	As both Buzzer and Alarm do not sound and secondary error can not be detected, stop traveling.
ATM error	E21	Discontinuity in Steering Mode Signal	Move the machine to a safe place by two-front-steering while locking rear steering, and then stop traveling.
ATM error	E24	Short circuit with ground in Accelerator Potentiometer	As Auto Speed Control is incorrect, move the machine to a safe place and stop operation.
ATM error	E25	Short circuit with ground in Emergency Speed Control SW	As impossible to use Emergency Speed Control, stop traveling. If emergency occurs, move the machine by using valves.
ATM error	E32	Abnormality in Speed Sensor 1	As both Buzzer and Alarm do not sound, stop traveling before emergency stop due to secondary error.
ATM error	E33	Abnormality in Speed Sensor 2	As Buzzer and Alarm do not sound, stop traveling before emergency stop due to secondary error.
ATM error	E37	Abnormality in Shift Lever	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.

Error code display		Error content	Error actual remedy
ATM error	E34	Error in Accelerator Potentiometer Start	As Auto Speed Control is incorrect and Low Idle can not be detected, move the machine to a safe place and stop operation.
ATM error	E35	MDT does not indicate N for Interlock Lock Signal N	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.
ATM error	E38	FR Signal for interlock turned ON simultaneously	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.
ATM error	E39	MDT indicates N for Interlock Lock Signal FR	As incorrect Auto Speed Control and time lag when changing speed exist, move the machine to a safe place and stop operation.
ATM error	E3F	Abnormality in S-NET (communication between MDTs)	As impossible to remedy, stop traveling.
ATM error	E55	Battery Voltage Drop	As impossible to remedy, stop traveling.
ATM error	E70	Discontinuity in RSOL	As impossible to reverse, stop traveling. Move the machine to a safe place by using Emergency Speed Control.
ATM error	E71	Discontinuity in F2SOL	As impossible to shift to F2, stop traveling. Move the machine to a safe place by using Emergency Speed Control.
ATM error	E72	Discontinuity in F1SOL	As impossible to shift to F1, move the machine to a safe place and stop traveling.
ATM error	E73	Discontinuity in F3SOL	As impossible to reverse, move the machine to a safe place and stop traveling.
ATM error	E74	Discontinuity in Lock Up SOL	As impossible to use Lock UP, move the machine to a safe place and stop traveling.
ATM error	E78	Discontinuity in LoSOL	As impossible to travel at Lo, move the machine to a safe place and stop traveling.
ATM error	E79	Discontinuity in 4WDSOL	As impossible to use 4WD, move the machine to a safe place and stop traveling.
ATM error	E7F	Discontinuity in Special Steering Relay	Move the machine to a safe place by two-front-steering while locking rear steering, and then stop traveling.
ATM error	E7B	Discontinuity in Reverse Steering Relay	Move the machine to a safe place by normal steering while locking rear steering, and then stop traveling.
ATM error	E7C	Discontinuity in R-F2SOL Cut	As impossible to travel, stop traveling.

Error code display		Error content	Error actual remedy
ATM error	E7D	Hot short due to discontinuity in Back Lamp Relay	As impossible to use Back Lamp and Alarm when reversing, move the machine to a safe place and stop traveling.
ATM error	E7E	Discontinuity in F1-F3SOL Cut Relay	As impossible to shift to F1/F3, move the machine to a safe place and stop traveling.
ATM error	E80	Short circuit with ground in RSOL	As impossible to reverse, stop operation Move the machine to a safe place by using Emergency Speed Control.
ATM error	E81	Short circuit with ground in F2SOL	As impossible to shift to F2, stop operation. Move the machine to a safe place by using emergency speed changing.
ATM error	E82	Short circuit with ground in F1 SOL	As impossible to shift to F1, move the machine to a safe place and stop traveling.
ATM error	E83	Short circuit with ground in F3 SOL	As impossible to shift to F3, move the machine to a safe place and stop traveling.
ATM error	E84	Short circuit with ground in Lock Up SOL	As impossible to use Lock UP, move the machine to a safe place and stop traveling.
ATM error	E88	Short circuit with ground in LoSOL	As impossible to travel at Lo, move the machine to a safe place and stop traveling.
ATM error	E89	Short circuit with ground in 4WDSOL	As impossible to use 4WD, move the machine to a safe place and stop traveling.
ATM error	E8F	Short circuit with ground in Special Steering Relay	Move the machine to a safe place by two-front-steering while locking rear steering, and then stop traveling.
ATM error	E8B	Short circuit with ground in Reverse Steering Relay	Move the machine to a safe place by normal steering while locking rear steering, and then stop traveling.
ATM error	E8C	Short circuit with ground in R-F2SOL Cut Relay	As impossible to travel, stop the machine.
ATM error	E8D	Short circuit with ground in Back Lamp Relay	As impossible to use Back Lamp and Alarm when reversing, move the machine to a safe place and stop traveling.
ATM error	E8E	Short circuit with ground in F1-F3SOL Cut Relay	As impossible to shift to F1/F3, move the machine to a safe place and stop traveling.

13. COLD WEATHER OPERATION

13.1 PRECAUTIONS FOR LOW TEMPERATURE

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

13.1.1 FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

13.1.2 COOLANT

⚠ WARNING

Keep antifreeze fluid away from open flame.
Never smoke when using antifreeze.

NOTICE

- **Never use methanol, ethanol or propanol based antifreeze.**
- **Absolutely avoid using any water leak preventing agent irrespective of whether it is used independently or mixed with an antifreeze.**
- **Do not mix one antifreeze with a different brand.**

For details of the antifreeze mixture when changing the coolant, see "23.2 WHEN REQUIRED".

Use a Permanent Antifreeze (ethylene glycol mixed with corrosion inhibitor, antifoam agent, etc.) meeting the standard requirements as shown below. With permanent antifreeze, no change of coolant is required for a year. If it is doubtful that an available antifreeze meets the standard requirements, ask the supplier of that antifreeze for information.

Standard requirements for permanent antifreeze

- SAE J1034
- FEDERAL STANDARD O-A-548D

REMARK

Where no permanent antifreeze is available, an ethylene glycol antifreeze without corrosion inhibitor may be used only for the cold season. In this case, clean the cooling system twice a year (in spring and autumn). When refilling the cooling system, add antifreeze in autumn, but do not add any in spring.

13.1.3 BATTERY

⚠ WARNING

- **To avoid gas explosions, do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amounts of water, and consult a doctor.**

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charge ratio is low, the battery electrolyte may freeze. Maintain the battery charge as close as possible to 100%, and insulate it against cold temperature so that the machine can be started easily the next morning.

REMARK

Measure the specific gravity and calculate the rate of charge from the following conversion table.

Temp. of fluid / Rate ofcharge	20°C	0°C	–10°C	–20°C
100%	1.28	1.29	1.30	1.31
90%	1.26	1.27	1.28	1.29
80%	1.24	1.25	1.26	1.27
75%	1.23	1.24	1.25	1.26

13.2 PRECAUTIONS AFTER COMPLETION OF WORK

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, always observe the following precautions.

- Mud and water on the machine body should be completely removed. This is to prevent damage to the seal caused by mud or dirt getting inside the seal with frozen drops of water.
- Park the machine on hard, dry ground. If this is impossible, park the machine on wooden boards.
- Open the drain valve and drain the water accumulated in the air tank and fuel system to prevent the water from freezing.
- As the battery capacity drops remarkably in low temperatures, cover the battery or remove it from the machine, keep it in a warm place, and install it again the next morning.

13.3 AFTER COLD WEATHER

When season changes and the weather becomes warmer, do as follows.

- Replace the fuel and oil for all parts with oil of the viscosity specified.
  For details, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".
- If for any reason permanent antifreeze cannot be used, and an ethyl glycol base antifreeze (winter, one season type) is used instead, or if no antifreeze is used, drain the cooling system completely, then clean out the inside of the cooling system thoroughly, and fill with fresh water.

14. LONG-TERM STORAGE

14.1 BEFORE STORAGE

When putting the machine in storage for a long time, do as follows.

- After every part has been washed and dried, the machine must be housed in a dry building. Never leave it outdoors.
  In case it is indispensable to leave it outdoors, park the machine on well-drained concrete and cover it with canvas etc.
  Extend the outriggers and raise the tires off the ground.

- Carry out all operations for adding oil, greasing, and changing oil.

- Set the tire inflation pressure to approx. 80% of the standard pressure.

- Coat the piston rods of the hydraulic cylinders with grease.

- Disconnect the negative terminals of the battery and cover it, or remove it from the machine and store it separately.

- If the ambient temperature is expected to drop below 0°C, always add antifreeze to the cooling water.

14.2 DURING STORAGE

⚠ WARNING

If it is unavoidably necessary to carry out the rustpreventive operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

Operate the engine and move the machine for a short distance once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the battery.

Before operating the work equipment, wipe off the grease from the hydraulic cylinder rods.

14.3 AFTER STORAGE

NOTICE

If the machine is stored without carrying out the monthly rust prevention operation, contact your Komatsu distributor for service.

Carry out the following procedure when taking the machine out of long-term storage.

- Wipe off the grease from the hydraulic cylinder rods.
- Remove the drain plugs from the oil pan and each case, and drain out any water.
- Check for any rust on moving parts, and if any rust is found, clean, add oil, or adjust.

15. TROUBLESHOOTING

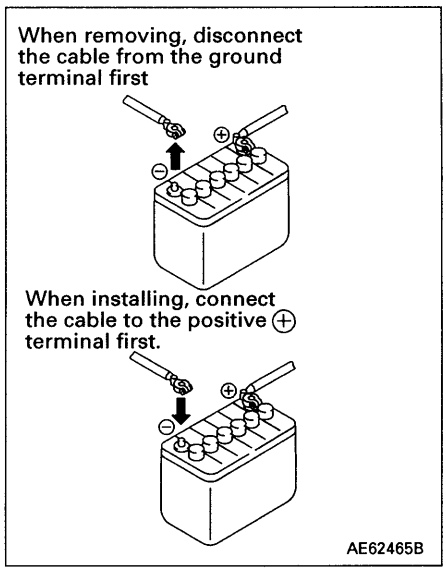
15.1 WHEN MACHINE RUNS OUT OF FUEL

When starting the engine after the machine has run out of fuel, add fuel, then fill the fuel filter cartridge with fuel and bleed the air from the fuel system before starting the engine.
For details of the method of bleeding the air, see "23.7 EVERY 500 HOURS SERVICE".

15.2 IF BATTERY IS DISCHARGED

⚠ WARNING

- **When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position before starting.**
- **Before starting the engine, use a damp cloth to wipe off the dust accumulated on the top surface of the battery.**
- **The battery generates hydrogen gas, so there is danger of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.**
- **Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large amounts of water. If it gets in your eyes, wash it out with fresh water, and consult a doctor.**
- **When handling the battery, always wear protective goggles.**
- **When removing the battery, first disconnect the cable from the ground (normally, from the negative ⊖terminal). When installing, install the positive ⊕ terminal first. If a tool touches the cable connecting the positive terminal and the chassis, there is danger that it will cause sparks.**
- **If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion. When installing the terminals, install them tightly.**
- **When removing or installing, check which is the positive ⊕ terminal and negative ⊖ terminal.**



15.2.1 REMOVING, INSTALLING BATTERY WIRING

1. When removing the wiring, first disconnect the cable from the ground (normally the negative ⊖ terminal).
   If a tool touches the cable connecting the positive ⊕ terminal and the chassis, there is danger that it will cause sparks.
   Loosen the terminal nut, then remove wiring from the battery.

2. When installing the wiring, connect the cable to the ground last.
   Insert the terminal hole on the battery, then tighten the nuts.

15.2.2 PRECAUTIONS FOR CHARGING BATTERY

Charging battery when mounted on machine

- Before charging, disconnect the cable from the negative ⊖ terminal of the battery. Otherwise, an unusually high voltage will damage the alternator.

- While charging the battery, remove all battery plugs for satisfactory ventilation.
  To avoid gas explosions, do not bring fire or sparks near the battery.

- If the electrolyte temperature temperature exceeds 45°C, stop charging for a while.

- Turn off the charger as soon as the battery is charged.
  Overcharging the battery may cause the following:
  1) Overheating the battery.
  2) Decreasing the quantity of electrolyte.
  3) Damaging the electrode plate.

- Do not mix the cables (positive ⊕ to negative ⊖ or negative ⊖ to positive ⊕), as it will damage the alternator.

- When performing any service to the battery besides checking the electrolyte lever or measuring the specific gravity, disconnect cables from the battery.

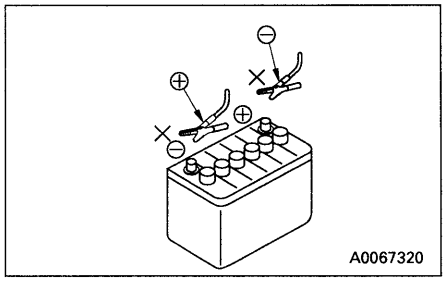
15.2.3 STARTING ENGINE WITH BOOSTER CABLES

When starting the engine with booster cables, do as follows:

Precautions when connecting and disconnecting booster cables

⚠ WARNING

- **When connecting the cables, never contact the positive ⊕ and negative ⊖ terminals.**
- **When starting the engine with booster cables, always wear safety glasses.**
- **Be careful not to let the normal machine and the problem machine touch.**
- **Be careful not to mistake the connections of the booster cables. Connect the cable to the engine block of the problem machine last. When doing this, sparks will be generated, so carry out the connection at a place as far as possible away from the battery.**
- **Use care when removing the cables from the machine that has been started. Do not allow the cable ends to contact each other or the machine, to avoid hydrogen explosion.**



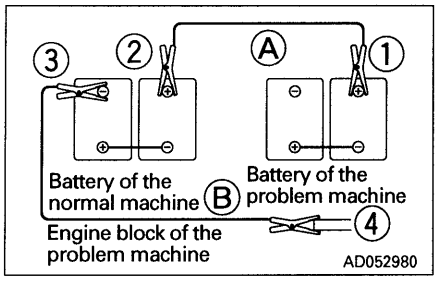
NOTICE

- **The size of the booster cable and clip should be suitable for the battery size.**
- **The battery of the normal machine must be the same capacity as that of the engine to be started.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**

Connecting the booster cables

Keep the starting switch at the OFF position.

Connect the booster cable as follows, in the order of the numbers marked in the diagram.



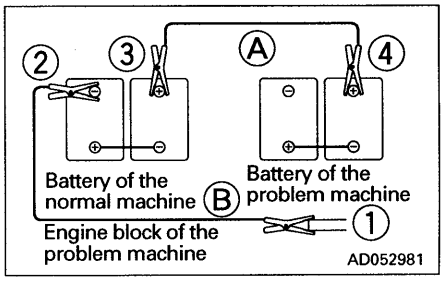
1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable Ⓐ to the positive ⊕ terminal of the problem machine.
3. Connect the other clip of booster cable Ⓐ to the positive ⊕ terminal of the normal machine.
4. Connect one clip of booster cable Ⓑ to the negative ⊖ terminal of the normal machine.
5. Connect the other clip of booster cable Ⓑ to the engine block of the problem machine.

Starting the engine

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and keep it to run at high idling speed.
3. Turn the starting switch of the problem machine to the START position and start the engine. If the engine doesn't start at first, try again after 2 minutes or so.

Disconnecting the booster cables

After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.



1. Remove one clip of booster cable Ⓑ from the engine block of the problem machine.
2. Remove the other clip of booster cable Ⓑ from the negative ⊖ terminal of the normal machine.
3. Remove one clip of booster cable Ⓐ from the positive ⊕ terminal of the normal machine.
4. Remove the other clip of booster cable Ⓐ from the position ⊕ terminal of the problem machine.

15.3 OTHER TROUBLE

15.3.1 ELECTRICAL SYSTEM

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	• Defective wiring	(• Check, repair loose terminals, disconnections)
Lamp flickers while engine is running	• Defective adjustment of fan belt tension	• Adjust fan belt tension For details, see EVERY 250 HOURS SERVICE
Charge monitor does not go out even when engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not turn when starting switch is turned ON	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Pinion of starting motor keeps going in and out	• Insufficient battery charge	• Charge
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge

15.3.2 CHASSIS (TRAVEL PORTION)

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
TRANSMISSION		
Engine is running but machine does not move	• Gear shift lever is not shifted properly to position • Defective wiring • Circui pressure does not rise • Transmission pump worn, scuffing • Oil leakage from oil line • Insufficient oil in transmission case • Clogged filter element, strainer in oil line • Defective operation of control valve	• Shift gear shift lever properly (• Check, repair) • See next item (• Check, replace) • (• Check, repair) • Add oil to specified level. See EVERY 50 HOURS SERVICE. • Clean, replace (• Check, repair)
Even at full throttle, machine only moves slowly and lacks power	• Insufficient oil in transmission case • Clogged filter element, strainer in oil line	• Add oil to specified level. See EVERY 50 HOURS SERVICE. (• Disassemble, clean)
Machine travels in some speed ranges.	• Defective wiring • Defective gear shift controller (transmission control)	(• Check, repair) (• Replace)
Oil overheats	• Insufficient oil in transmission case • Machine is not traveling in proper speed range • Torque converter has been stalled for too long • Radiator clogged with grass, mud	• Add oil to specified level. See EVERY 50 HOURS SERVICE. • Travel in suitable speed range • Reduce stall time • Clean
Abnormal noise generated	• Insufficient oil in transmission case	• Add oil to specified level. See EVERY 50 HOURS SERVICE.

15.3.2 CHASSIS (TRAVEL PORTION) (continued)

Problem	Main causes	Remedy
TORQUE CONVERTER		
Drive does not enter torque converter range	• Defective wiring • Defective operation of control solenoid valve	(• Check, repair) (• Check, replace)
AXLE		
Abnormal noise generated	• Lack of oil	• Add oil to specified level.
WHEEL BRAKE		
Braking effect is poor when pedal is depressed	• Insufficient brake oil • Air in break oil line • Air pressure does not rise (leakage of air from pipe)	• Add brake oil • Bleed air (• Check, repair)
Brakes pull to one side or drag	• Clogged breather in brake valve • Clogged breather in relay valve	• Clean • Clean
Brake slips	• Oil or grease stuck to brake lining	• Clean
PARKING BRAKE		
Braking effect is poor	• Defective adjustment of brake shoe • Deteriorated spring in brake chamber	(• Adjust) (• Check, replace)
STEERING		
Steering wheel is heavy	• Improper inflation of tires • Defective operation of priority valve	• Inflate to specified pressure (• Check, repair)
Steering wheel shakes	• Tighten steering wheel locknut	• Tighten

15.3.3 CHASSIS (WORK EQUIP PORTION)

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
PUMP		
Work equipment does not move	• Blown fuse • Defective switch • Defective solenoid valve • Defective wiring	• Replace (• Check, replace) (• Check, replace) (• Check, repair)
Abnormal noise generated	• Clogged strainer • Loose mounting bolt • Lack of oil	• Check, clean • Check, tighten • Check, add oil
OUTRIGGERS		
Outriggers do not move	• Blown fuse • Defective switch • Defective solenoid valve • Defective wiring	• Check, replace (• Check, replace) (• Check, replace) (• Check, repair)
Outriggers move sluggishly	• Drop in set pressure of relief valve	(• Check, adjust)
Jack cylinder retracts during operations	• Defective double pilot check valve	(• Check, replace)
Jack cylinders extend when machine is traveling	• Defective double pilot check valve	(• Check, replace)
SWING		
Brakes do not work	• Air in oil line • Defective master cylinder	• Bleed air (• Check, repair)
Upper structure does not swing, swings sluggishly	• Drop in set pressure of relief valve • Brake still applied • Defective solenoid valve	(• Check, adjust) (• Check, repair) (• Check, replace)

15.3.3 CHASSIS (WORK EQUIP PORTION) (continued)

Problem	Main causes	Remedy
BOOM HOIST		
Cylinder does not extend	• Drop in set pressure of relief valve • Outrigger solenoid has not returned to neutral	(• Check, adjust) (• Check, replace)
Cylinder does not retract	• Defective counterbalance valve • Outrigger solenoid has not returned to neutral	(• Check, repair) (• Check, replace)
Cylinder retracts because of hydraulic drift during operations	• Defective counterbalance valve	(• Check, repair)
BOOM TELESCOPE		
Boom does not retract	• Defective counterbalance valve • Outrigger solenoid has not returned to neutral	(• Check, repair) (• Check, replace)
Boom does not extend	• Drop in set pressure of relief valve • Outrigger solenoid has not returned to neutral	(• Check, adjust) (• Check, replace)
Boom goes down because of hydraulic drift during operations	• Defective counterbalance valve	(• Check, repair)
WINCH		
Winch does not wind in	• Drop in set pressure of relief valve • Winch clutch slipping • Leakage of oil from winch cluch circuit • Incorrect clearance of brake pad • Defective shuttle valve • Outrigger solenoid has not returned to neutral	(• Check, adjust) (• Check, adjust) (• Check, repair) (• Check, repair) (• Check, repair) (• Check, replace)
Winch does not wind out	• Defective counterbalance valve • Defective shuttle valve • Leakage of oil from accumulator circuit • Incorrect clearance of brake pad • Outrigger solenoid has not returned to neutral	(• Check, repair) (• Check, repair) (• Check, repair) (• Check, replace)
Free-fall operation cannot be carried out	• Incorrect clearance of brake pad • Defective master cylinder • Leakage of oil from accumulator circuit • Seizure of drum shaft bearing	(• Check, adjust) (• Check, repair) (• Check, repair) (• Replace, add grease)

15.3.3 CHASSIS (WORK EQUIP PORTION) (continued)

Problem	Main causes	Remedy
Brake does not work	• Defective adjustment of pad clearance	(• Adjust)
	• Oil, water stuck to brake	(• Clean)
	• Air mixed in brake cylinder line	(• Bleed air)

15.3.4 ENGINE

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure caution lamp lights up	• Engine oil pan oil level is low (sucking in air)	• Add oil to specified level See CHECK BEFORE STARTING.
	• Clogged oil filter element	• Replace. See EVERY 250 HOURS SERVICE
	• Defective wiring	(• Check, repair)
Steam is emitted from top part of radiator (pressure valve)	• Coolant level low, water leakage	• Add coolant, repair. See CHECK BEFORE STARTING.
	• Loose fan belt	• Adjust fan belt tension. See EVERY 250 HOURS SERVICE
	• Dirt or scale accumulated in cooling system	• Change cooling water, clean inside of cooling system. See WHEN REQUIRED
	• Clogged radiator fin or damaged fin	• Clean or repair. See WHEN REQUIRED
Indicator of water temperature gauge is in red range	• Defective thermostat	(• Replace thermostat)
	• Loose radiator filler cap (high-altitude operation)	• Tighten cap or replace packing
	• Defective water temperature gauge	(• Replace water temperature gauge)
Indicator of water temperature gauge	• Defective thermostat	(• Replace thermostat)
	• Defective water temperature gauge	(• Replace water temperature gauge)
Engine does not start when starting motor is turned	• Lack of fuel	• Add fuel See CHECK BEFORE STARTING.
	• Air in fuel system	• Repair place where air is sucked in
	• Defective fuel injection pump or nozzle	(• Replace pump or nozzle)
	• Starting motor cranks engine sluggishly	See ELECTRICAL SYSTEM
	• Defective valve clearance	(Contact your Komatsu distributer
	• Defective operation of electric motor for fuel cut	for inspection)
Exhaust gas is white or blue	• Too much oil in oil pan	• Add oil to specified level See CHECK BEFORE STARTING.
	• Improper fuel	• Change to specified fuel

15.3.4 ENGINE (continued)

Problem	Main causes	Remedy
Exhaust gas turns black	• Clogged air cleaner element	• Clean or replace See WHEN REQUIRED
	• Defective nozzle	(• Replace nozzle)
	• Defective compression	• Adjust valve clearance. See above.
	• Defective turbocharger	(• Check or replace turbocharger)
Combustion noise occasionally makes breathing sound	• Defective nozzle	(• Replace nozzle)
	• Defective fuel injection pump	(• Replace pump)
Abnormal noise generated (combustion or mechanical)	• Low grade fuel being used	• Change to specified fuel
	• Overheating	• See "Indicator of water temperature gauge is in red range."
	• Damage inside muffler	• Replace muffler (Contact your Komatsu distributer for inspection)
	• Excessive valve clearance	
Engine speed does not rise when accelerator pedal is depressed	• Defective operation of accelerator valve	(• Check, replace)
	• Defective operation of air cylinder	(• Check, replace)
	• Scuffing of lever linkage	(• Check, repair)

MAINTENANCE

⚠ WARNING

Before carrying out maintenance, always attach the WARNING TAG to the control lever in the operator's cab.

16. GUIDES TO MAINTENANCE

Do not carry out any inspection and maintenance operation that is not found in this manual.
Perform maintenance work on hard, flat ground.

Check service meter:
Check the service meter reading every day to see if the time has come for any necessary maintenance to be carried out.

Komatsu genuine replacement parts:
Use Komatsu genuine parts specified in the Parts Book as replacement parts.

Komatsu genuine oils:
Use Komatsu genuine oils and grease. Choose oils and grease with proper viscosities specified for ambient temperature.

Always use clean washer fluid:
Use automobile window washer fluid and be careful not to let any dirt get into it.

Always use clean oil and grease:
Use clean oil and grease. Also, keep containers of the oil and grease clean. Keep foreign materials away from oil and grease.

Keeping the machine clean:
Always keep the machine clean. This makes is easier to find parts causing problems. Keep in particular grease fittings, breathers and oil level gauges clean and avoid foreign matters from getting in them.

Be careful of hot water and oil:
Draining hot oils and coolants and removing their filters immediately after the engine stops are hazardous. Allow the engine to cool.
If the oil has to be drained when it is cold, warm up the oil to a suitable temperature (approx. 20 – 40°C) before draining it.

Checking foreign materials in drained oil and on filter:
After oil is changed or filters are replaced, check the oil and filters for metallic particles and foreign materials. If large quantities of metallic particles or foreign materials are found, consult your Komatsu distributor.

Fuel strainer:
If your machine is equipped with a fuel strainer, do not remove it while fueling.

Oil change:
Check or change oils in the places where dust is scarce to keep foreign materials away from oils.

Warning tag:
Attach the warning tag to the starting switch or other appropriate control lever to avoid someone who is not aware of the circumstances from starting the engine.

Obey precautions:
During the operation, always obey the precautions on the safety label attached to the machine.

Welding instructions:
- Turn off the engine starting switch.
- Do not apply more than 200 V continuously.
- Connect grounding the cable within 1 m (3 ft 3 in) from the area to be welded.
- Avoid seals or bearings from being between the area to be welded and the position of grounding point.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

Fire prevention:
Use nonflammable cleaner or light oil for cleaning parts. Keep flame or cigarette light away from light oil.

Clamp faces:
When O-rings or gaskets are removed, clean the clamp faces and replace the O-rings and gaskets with new ones. Be sure to fit O-rings and gaskets when assembling.

Objects in your pockets:
Keep your pockets free of loose objects which can fall out and drop into the machinery; especially when you work on the machinery while bending over it.

Checking undercarriage:
When working in rocky areas, check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nuts. Loosen the track tension a little when working in such areas.

Precautions when washing machine:
- Never spray steam or water directly on the connectors and mechatronics parts.
- Do not allow water to get on the monitors and controllers inside the operator's cab.
- Never spray steam or water directly at the radiator or oil cooler portions.

Pre-and post-work checks:
Before starting work in mud, rain, snow or at seashore, check plugs and valves for tightness.
Wash the machine immediately after the work to protect components from rusting.
Lubricate components more frequently than usual. Be sure to lubricate work equipment pins daily if they are submerged in water.

Dusty worksites:
When working at dusty worksites, do as follows:
- Inspect the air cleaner clogging monitor to see whether the air cleaner is blocked up. Clean the air cleaner at shorter intervals than specified.
- Clean the radiator core frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.

Avoid mixing oils:
Never mix oils of different brands. If you have only oil which is a different brand from the one that is used in the machine, do not add it but replace all the oil.

17. OUTLINES OF SERVICE

- Use Komatsu genuine parts as replacement parts.
- Do not use the differnt type of oil when replacing and adding oil.
- The types of oil and coolant when shipment are as follows unless otherwise provided.

Item	Type
Engine oil pan	SAE15W–40 API classification CD
Swing machinery case Winch gear case Final drive case Differential case	AXO75S
Transmission case	SAE10W API classification CD
Hydraulic tank	HO46-HM(*)
Fuel	ASTM D975 No. 2 (However, ASTMD975 No. 1 is used for winter season (October to March)
Radiator	Komatsu Super Coolant (AF-ACL) 30% added to water

* Use the Komatsu recommended oil for HO46-HM.
See "17.1.1 Oil" for replacement procedure.

17.1 OUTLINE OF OIL, FUEL, COOLANT

17.1.1 OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and it deteriorates with use.
  Always use oil that matches the grade and temperature for use given in the Operation and Maintenenance Manual. Even if the oil is not dirty, always replace the oil after the specified interval.
- Oil corresponds to blood in the human body, so always be careful when handling it to prevent any impurities (water, metal particles, dirt, etc.) from getting in.
  The majority of problems with machine are caused by the entry of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.

- Always add the specified amount of oil.
  Having too much oil or too little oil are both causes of problems.

- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit.
  In such cases, please contact your Komatsu distributor.

- When changing the oil, always replace the related filters at the same time.

- We recommend you to have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.

- When the machine is shipped from the plant, HO46-HM is used for the hydraulic oil.
  If the Komatsu recommended oil is not used for the hydraulic oil, it causes clogging of the filter.
  The following are the Komatsu recommended oil.

  When checking and refilling the hydraulic oil, please contact your Komatsu distributor.

The recomended oil HO46-HM

Maker	Name
Esso	Uni-power SQ46K
Mobil	Mobil DTE25
Shell	Hydrokonto oil K

17.1.2 FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
  Fuel may congeal depending on the temperature when it is used (particularly in low temperature below –15°C), so it is necessary to change to a fuel that matches the temperature.
- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

17.1.3 COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator, and this will cause defective heat exchange and overheating.
  Do not use water that is not suitable for drinking.
- When using anti-freeze, always observe the precautions given in the Operation & Maintenance Manual.
- Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped.
  This anti-freeze is effective in preventing corrosion of the cooling system.
  The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is even in hot areas.
- Anti-freeze is inflammable, so be extremely careful not to expose it to flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature.
  For details of the mixing proportions, see "23.2.4 CLEAN INSIDE OF COOLING SYSTEM".
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating and will also cause problems with corrosion from the air in the coolant.

17.1.4 GREASE

- Grease is used to prevent twisting and noise at the joints.

- The nipples not included in the maintenance section are nipples for overhaul, so they do not need grease.
  If any part becomes stiff after being used for long time, add grease.

- Always wipe off all of the old grease that is pushed out when greasing. Be particularly careful to wipe off the old grease in places. Where sand or dirt sticking in the grease would cause wear of the rotating parts.

- If grease runs out, carry out greasing even when it is not specified period to greasing as quickly as possible.

17.1.5 STORING OIL AND FUEL

- Keep indoors to prevent any water, dirt, or other impurities from getting in.

- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drum can is at the side. (To prevent moisture from being sucked in)
  If drum cans have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.

- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

17.1.6 FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.
  Replace all filters periodically. For details, see the Operation & Maintenance Manual.
  However, when working in severe conditions, it is necessary to consider replacing the filters at shorter intervals according to the oil and fuel (sulfur content) being used.

- Never try to clean the filters (cartridge type) and use them again. Always replace with new filters.

- When replacing oil filters, check if any metal particles are stuck to the old filter. If any metal particles are found, please contact your Komatsu distributor.

- Do not open packs of spare filters until just before they are to be used.

- Always use Komatsu genuine filters.

17.2 OUTLINE OF ELECTRIC SYSTEM

- If the wiring gets wet or the insulation is damaged, the electric system leaks and this could result in hazardous malfunction of the machine.
- Services relating to the electric system are check of fan belt tension, check of damage or wear in the fan belt and check of battery fluid level.
- Never remove or disassemble any electric components installed in the machine.
- Never install any electric components other than these specified by Komatsu.
- Be careful to keep the electric system free of water when washing the machine or when it rains.
- When working on the seashore, carefully clean the electric system to prevent corrosion.
- The optional power source must never be connected to the fuse, starting switch, or battery relay.

18. WEAR PARTS LIST

Wear parts such as the filter element are to be replaced at the time of periodic maintenance.
The wear parts should be changed correctly in order to use the machine economically.
When replacing parts, Komatsu genuine parts of excellent quality should be used.
When ordering parts, please check the part number in the parts book.

WEAR PARTS LIST
( ): Replace these parts at the same time

Item	Part No.	Part Name	Q'ty	Replacement interval
Engine oil filter	600-211-1231	Cartridge	1	Every 250 hours
Fuel filter	600-311-8293	Cartridge	1	Every 500 hours
Transmission case oil filter	424-16-11140 (424-16-11130)	Cartridge (O-ring)	1 (1)	Every 500 hours
Hydraulic filter	07063-01210 (07000-05185)	Element (O-ring)	1 (1)	Every 500 hours
Corrosion resistor	600-411-1151	Cartridge	1	Every 100 hours
Air cleaner	600-181-8230	Element assembly	1	–
Wire rope	23S-75-55110 23S-75-55120	Wire rope ø16 x 176 m, Wire rope ø16 x 98 m	1 1	–
Electrical intake air heater	6150-11-4821	Gasket	2	–
Grease cartridge	23S-47-25110	Grease reservoir	1	–

19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE -22 -4 14 32 50 68 86 104°F -30 -20 -10 0 10 20 30 40°C	CAPACITY Specified	 Refill
Engine oil pan	Engine oil	SAE 30 SAE 10W SAE 10W-30 SAE 15W-40	32 ℓ 8.45 US gal 7.04 UK gal	26 ℓ 6.86 US gal 5.72 UK gal
Transmission case		SAE 10W	25 ℓ 6.6 US gal 5.5 UK gal	25 ℓ 6.6 US gal 5.5 UK gal
Final drive case (each)		See Note 1	7.0 ℓ 1.75 US gal 1.54 UK gal	7.0 ℓ 1.85 US gal 1.54 UK gal
Winch gear case			7.0 ℓ 1.85 US gal 1.54 UK gal	7.0 ℓ 1.85 US gal 1.54 UK gal
Differential gear case (each)			35 ℓ 9.24 US gal 7.7 UK gal	35 ℓ 9.24 US gal 7.7 UK gal
Swing machinery case			3.0 ℓ 0.79 US gal 0.66 UK gal	3.0 ℓ 0.79 US gal 0.66 UK gal
Hydraulic system	Hydraulic oil	HO46-HM	520 ℓ 137 US gal 114 UK gal	420 ℓ 111 US gal 92 UK gal
Traveling break	Brake fluid	FMVSS DOT5 (Glycol type)	When changing the oil, please contact your Komatsu distributor	
Fuel tank	Diesel fuel	ASTM D975 No.2 ※	300 ℓ 79.2 US gal 66 UK gal	–
Cooling system	Water	**Add antifreeze**	40 ℓ 10.56 US gal 8.8 UK gal	–

※ ASTM D975 No. 1

※ Use the Komatsu recommended oil for HO46-HM.
See "17.1.1 Oil" for replacement procedure.

Note 1:
For axle oil, use only recommended oil as follows.
SHELL: DONAX TT or TD
CALTEX: RPM TRACTOR HYDRAULIC FLUID
CHEVRON: TRACTOR HYDRAULIC FLUID
TEXACO: TDH OIL
MOBIL: MOBILAND SUPER UNIVERSAL
It is possible to substitute engine oil CLASS-CD SAE30 for axle oil.
If noise comes from the brake, it is no problem of durability.

REMARK

- When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
  Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engin oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

- When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.

- Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

- There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.

- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Materials
SAE: Society of Automotive Engineers
API: American Petroleum Institute

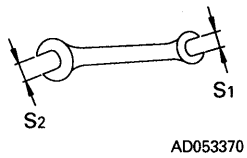
No.	Supplier	**Engine Oil [CD or CE]** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	**Gear Oil [GL-4 or GL-5]** SAE80, 90, 140	**Grease [Lithium-Base]** NLGI No. 2	**Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type**
1	KOMATSU	EO10-CD EO30-CD EO10-30CD EO15-40CD	GO90 GO140	G2-LI G2-LI-S	AF-ACL AF-PTL AF-PT (Winter, one season type)
2	AGIP	Diesel sigma S Super dieselmulti-grade *Sigma turbo	Rotra MP	GR MU/EP	–
3	AMOCO	*Amoco 300	Multi-purpose gear oil	RYKON prenium grease	–
4	ARCO	*Arcofleet S3 plus	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	–
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 Ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHEVRON	*Delo 400	Universal gear	Ultra-duty grease 2	–
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	–
10	ELF	Multiperformance 3C Performance 3C	–	Tranself EP Tranself EP type 2	Glacelf
11	EXXON (ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifreeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgrease 77 Mobilgrease special	–

No.	Supplier	**Engine Oil [CD or CE]** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.)	**Gear Oil [GL-4 or GL-5]** SAE80, 90, 140	**Grease [Lithium-Base]** NLGI No. 2	**Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type**
14	PENNZOIL	*Supreme duty fleet motor oil	Multi-purpose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White – bearing grease	Anti-freeze and summer coolant
15	PETROFINA	FINA kappa TD	FINA potonic N FINA potonic NE	FINA marson EPL2	FINA tamidor
16	SHELL	Rimula X	Spirax EP Spirax heavy duty	Alvania EP grease	–
17	SUN	–	Sunoco GL5 gear oil	Sunoco ultra prestige 2EP Sun prestige 742	Sunoco antifreeze and summer coolant
18	TEXACO	*Ursa super plus Ursa premium	Multigear	Multifak EP2 Starplex 2	Code 2055 startex antifreeze coolant
19	TOTAL	Rubia S *Rubia X	Total EP Total transmission TM	Multis EP2	Antigel/antifreeze
20	UNION	*Guardol	MP gear lube LS	Unoba EP	–
21	VEEDOL	*Turbostar *Diesel star MDC	Multigear Multigear B Multigear C	–	Antifreeze

20. STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

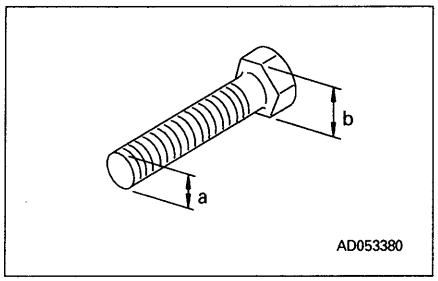
20.1 INTRODUCTION OF NECESSARY TOOLS

The following tools are needed when carrying out maintenance.

No.	Name of tool	Part No.	Remarks
1	Wrench set	09000–30006	Applicable width across flats (S_1-S_2) 8mm – 10mm 12mm – 14mm 13mm – 17mm 19mm – 22mm 24mm – 27mm 30mm – 32mm  AD053370
2	Socket wrench set	09020-10282	
3	Screwdriver	09033-00190	Interchangeable flat-head and cross-head type
4	Pliers	09036-00150	
5	Wrench	09002-03641	Jaw size: 36 mm – 41 mm
6	Socket	09084-03853	
7	Gauge	09289-00000	For tire inflation pressure
8	Filter wrench	09019-08035	
9	Tube	07270-00690	For bleeding air
10	Grease pump	07952-80002	For lithium base grease
11	Grease pump	07952-40000	For molybdenum disulfide grease
12	Nozzle	07951-11400	For grease pump
13	Cartridge	07950-90403	Lithium grease
14	Gauge	23S-98-21310	Brake pad wear gauge

If any of the above tools are broken, please order replacements from your Komatsu ditributor.

20.2 TORQUE LIST



Unless otherwise specified, tighten the metric bolts and nuts to the torque shown in the table.

The tightening torque is determined by the width across the flats ⓑ of the nut and bolt.

If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

N•m (newton meter): 1N•m ≒ 0.1 kgf•m
≒ 0.74 lbft

Thread diameter of bolt (mm) (a)	Width across flat (mm) (b)	Ⓣ Ⓗ AD054300		
		N•m	kgf•m	lbft
6	10	13.2 ± 1.4	1.35 ± 0.15	9.73 ± 1.03
8	13	31.4 ± 2.9	3.2 ± 0.3	23.2 ± 2.1
10	17	65.7 ± 6.8	6.7 ± 0.7	48.5 ± 5.0
12	19	112 ± 9.8	11.5 ± 1.0	82.6 ± 7.2
14	22	177 ± 19	18.0 ± 2.0	131 ± 14
16	24	279 ± 29	28.5 ± 3	206 ± 21
18	27	383 ± 39	39 ± 3	282 ± 29
20	30	549 ± 58	56 ± 6	405 ± 43
22	32	745 ± 78	76 ± 8	549 ± 58
24	36	927 ± 98	94.5 ± 10	684 ± 72
27	41	1320 ± 140	135 ± 15	973 ± 100
30	46	1720 ± 190	175 ± 20	1270 ± 140
33	50	2210 ± 240	225 ± 25	1630 ± 180
36	55	2750 ± 290	280 ± 30	2030 ± 210
39	60	3280 ± 340	335 ± 35	2420 ± 250

NOTICE

When tightening panels or other parts having tightening fixtures made of plastic, be careful not to use excessive tightening torque: doing so will damage the plastic parts.

21. PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the user should also carry out periodic replacement of the parts given in the table. These parts are particularly closely connected to safety and fire prevention.

With these parts, the material changes as time passed, or they easily wear or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. This is necessary to ensure that they always maintain their function completely.

However, if these parts show any abnormality before the replacement interval has passed, they should be repaired.

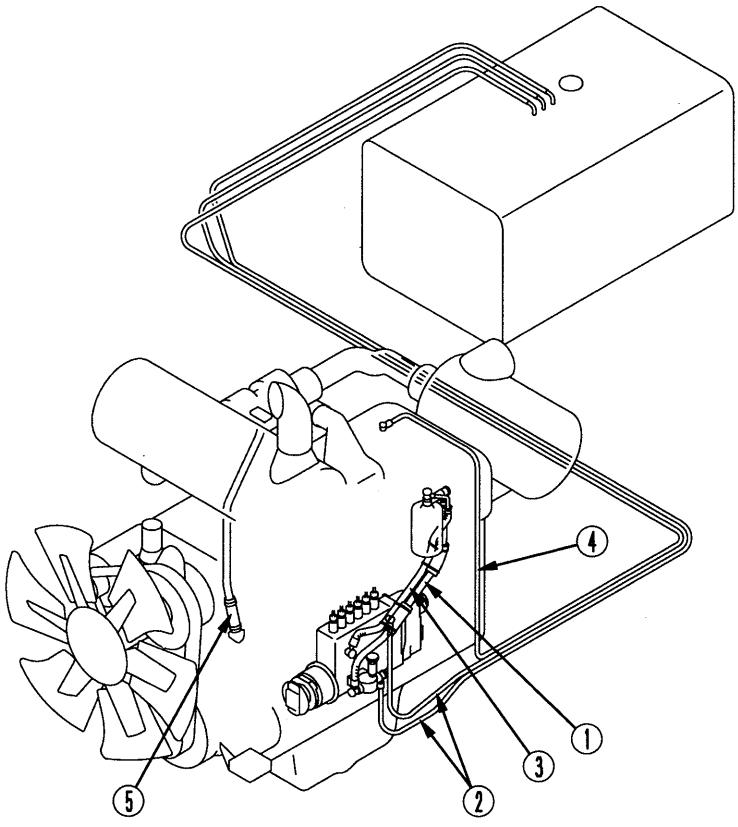
Furthermore, check the oil pressure hoses other than periodical replacing parts as follows, and if any deterioration is detected, tighten further or replace it.

When replacing the hoses, always replace the O-rings, gaskets, and other such parts at the same time.

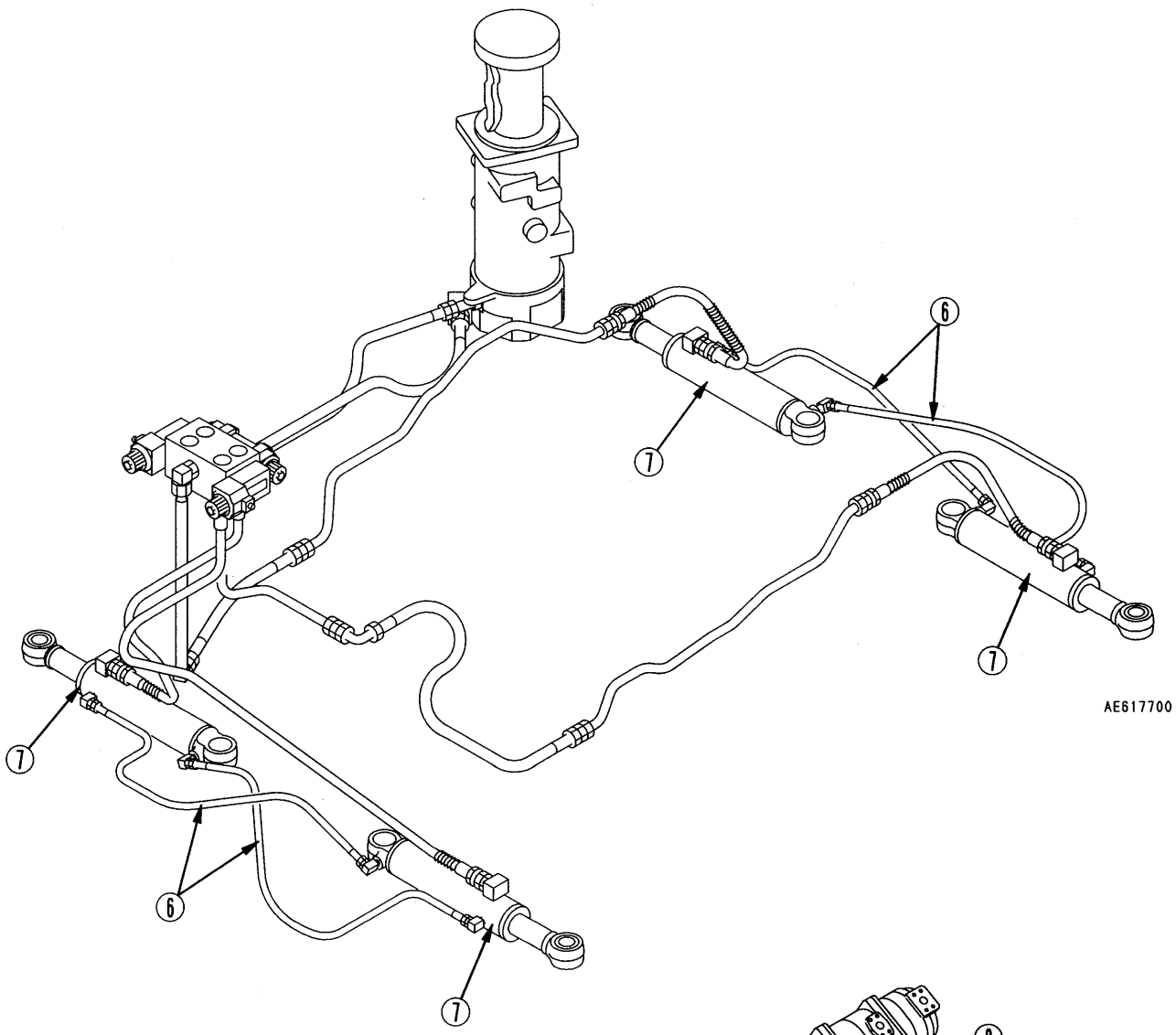
Contact Komatsu or Komatsu distributer for replacing the critical parts.

CRITICAL SAFETY PARTS

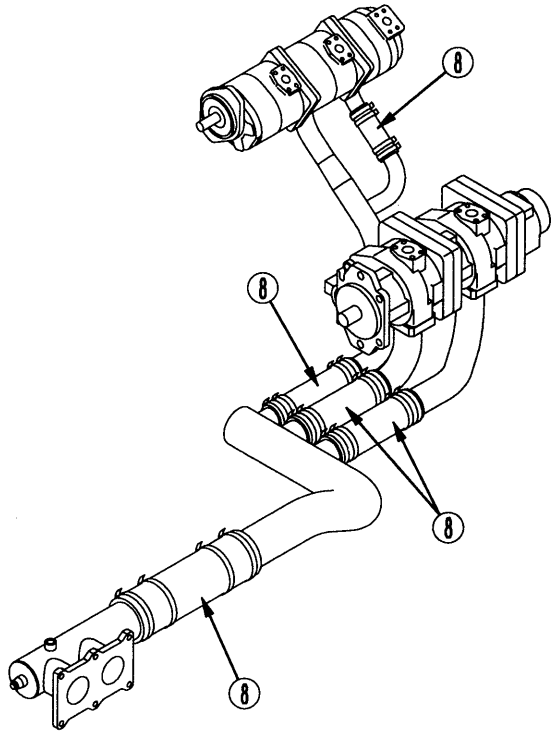
No.	Periodical replacement parts	Interval
1	Fuel hose (fuel filter – injection pump)	Every 2 years
2	Fuel hose (fuel tank – injection pump)	
3	Fuel hose (injection pump – fuel filter)	
4	Spill hose (nozzle – fuel tank)	
5	Turbocharger lubricant hose (turbocharger – engine block)	
6	Rubber hose for steering cylinder	
7	Packing, seal and O-ring of steering cylinder	
8	Hydraulic oil suction hose	
9	Rubber parts of tread bulb	
10	Rubber parts of break booster	
11	Rubber parts of disc break caliper cylinder	
12	Break hose (air and oil line)	
13	Break fluid	Every year
14	Seat belt	Every 3 years



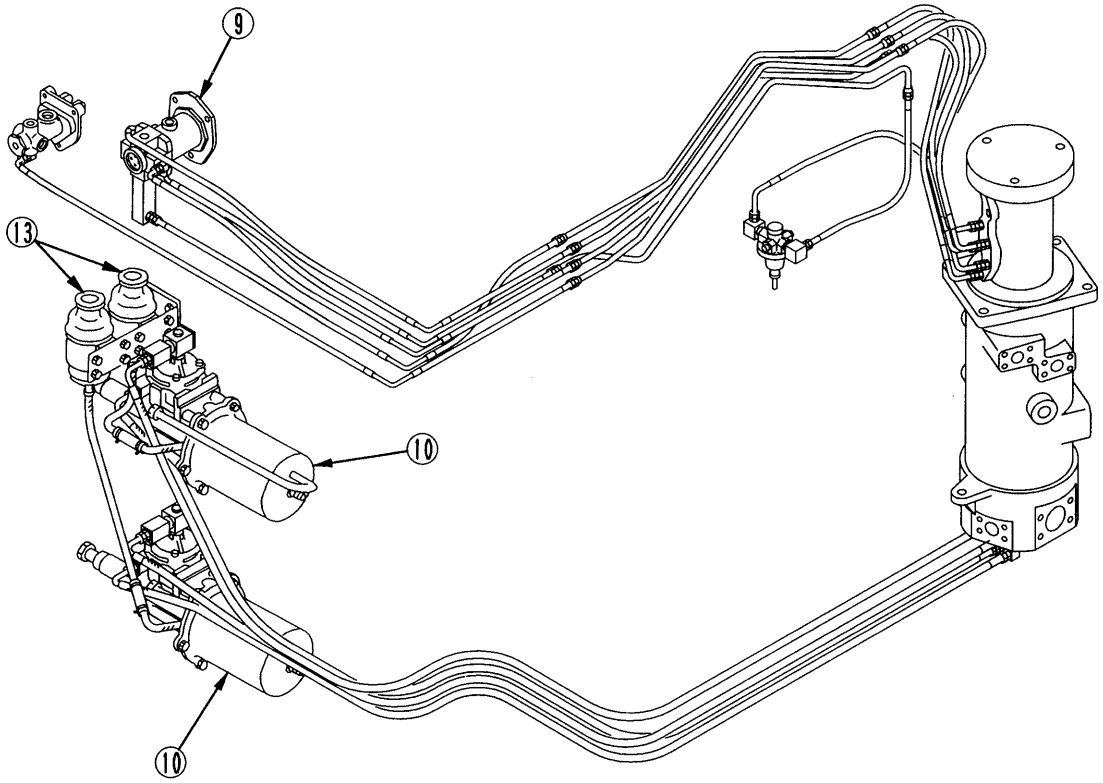
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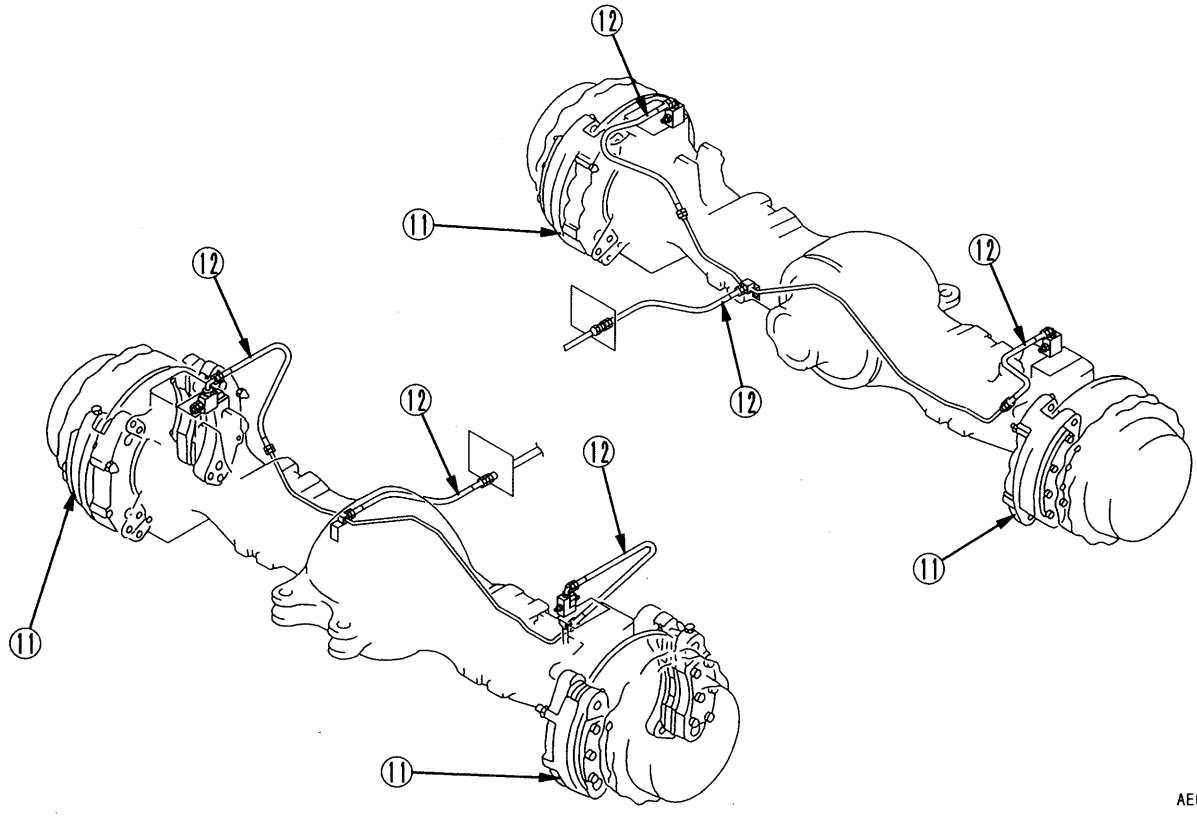
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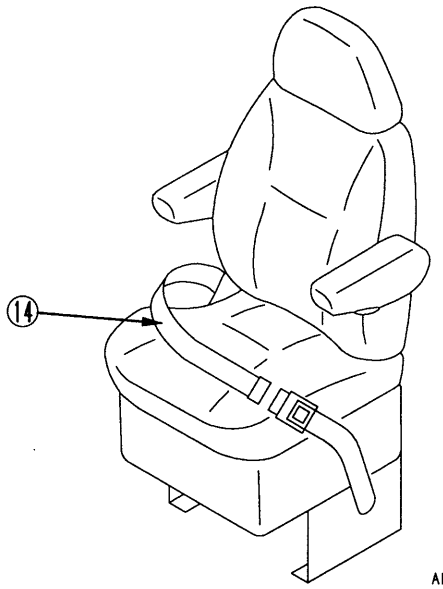
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22. MAINTENANCE SCHEDULE CHART

22.1 MAINTENANCE SCHEDULE CHART

SERVICE ITEM	PAGE
INITIAL 250 HOURS SERVICE	
Replace fuel filter cartridge	3-27
Replace hydraulic filter element	3-27
Change oil in transmission case, clean strainer	3-27
Change oil in final drive gear case	3-27
Change oil in differential gear case	3-27
Check engine valve clearance, adjust	3-27
WHEN REQUIRED	
Grease door rail and roller	3-28
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23. SERVICE PROCEDURE

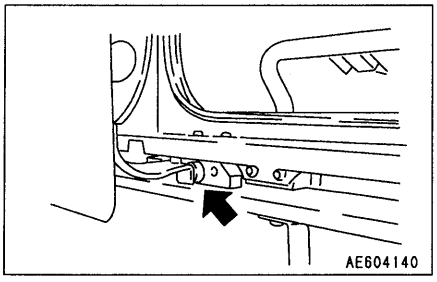
23.1 INITIAL 250 HOURS SERVICE

Carry out the following maintenance only after the first 250 hours.

- **REPLACE FUEL FILTER CARTRIDGE**
- **REPLACE HYDRAULIC FILTER ELEMENT**
- **CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER**
- **CHANGE OIL IN FINAL DRIVE GEAR CASE**
- **CHANGE OIL IN DIFFERENTIAL GEAR CASE**
- **CHECK ENGINE VALVE CLEARANCE, ADJUST**

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS and 2000 HOURS SERVICE.

23.2 WHEN REQUIRED



23.2.1 GREASE DOOR RAIL AND ROLLER

1. Using a grease pump, pump in grease through the grease fitting marked by the arrow.

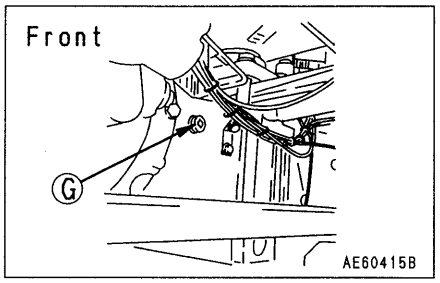
2. After greasing, wipe off any old grease that is pushed out.

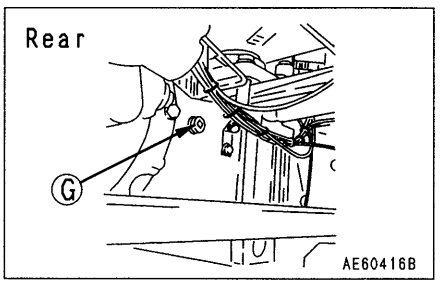
For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBLICANT ACCORDING TO AMBIENT TEMPERATURE".

23.2.2 CHECK OIL LEVEL IN DIFFERENTIAL GEAR CASE, ADD OIL

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.





Carry out this check if oil stains can be seen on the differential gear case.

1. Remove level plug Ⓖ and check that the oil level is near the bottom of the plug hole.

2. If the oil level is low, add gear oil through the plug hole until it overflows.

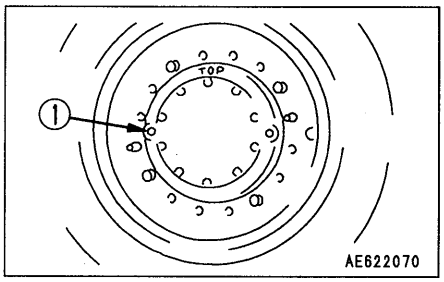
For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

23.2.3 CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

Carry out this check if oil stains can be seen on the final drive case.



1. Stop the machine so that the TOP casting mark on the final drive case is at the top.
2. Remove the level plug and check that the oil level is near the bottom of plug hole ①.
3. If the oil level is low, add gear oil through plug hole ① until it overflows.

For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANT ACCORDING TO AMBIENT TEMPERATURE".

23.2.4 CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Soon after the engine has been stopped, the coolant is hot and can cause personal injury. Allow the engine to cool before draining water.**
- **Since cleaning is performed while the engine is running, it is very dangerous to enter the rear side of the machine as the machine may suddenly start moving. While the engine is running, never enter the rear side of the machine.**
- **Never remove the radiator cap when the engine is at operating temperature. At operating temperature, the coolant is under pressure. Steam blowing up from from the radiator could cause personal injury. Allow the engine cool until the radiator filter cap is cool enough to touch with your hand. Remove the filter cap slowly to allow pressure to be relieved.**

- Clean the inside of the cooling system change the coolant and replace the corrosion resistor according to the table below.

Kind of coolant	Cleaning inside of cooling system and changing coolant	Replacing corrosion resistor
Permanent type antifreeze (All season type)	Every year (autumn) or every 2000 hours whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant
Non permanent type antifreeze containing ethylene glycol (Winter, one season type)	Every 6 months (spring, autumn) (Drain antifreeze in spring, add antifreeze in autumn)	
When not using antifreeze	Every 6 months or every 1000 hours whichever comes first	

- Stop the machine on level ground when cleaning or changing the coolant.
- Use a permanent type of antifreeze.
  If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.

Super Coolant (AF-ACL) has anti-freeze effect and anti-corrosion effect.

The mixture rate is different according the temperature. Minimum 30 % of the capacity is needed to have anti-corrosion effect.

When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing rate table given below.

It is actually better to estimate a temperature about 10% lower when deciding the mixing rate.

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	–10	–15	–20	–25
	°F	14	5	–4	–13
Amount of antifreeze	ℓ	12.0	14.4	16.4	18.4
	US gal	3.17	3.80	4.33	4.86
	UK gal	2.64	3.17	3.61	4.05
Amount of water	ℓ	28.0	25.6	23.6	21.6
	US gal	7.39	6.76	6.23	5.70
	UK gal	6.16	5.63	5.19	4.75

⚠WARNING

Antifreeze is flammable, so keep it away from any flame.

- Use city water for the cooling water.
  If river water, well water or other such water supply must be used, contact your Komatsu distributor.

- We recommend use of an antifreeze density gauge to control the mixing proportions.

⚠WARNING

When removing drain plug, avoid pouring coolant on yourself.

1. Stop the engine and tighten corrosion resistor levers.

2. Turn radiator cap ① slowly to remove it.

3. Set a container to catch the mixture of water and coolant. Open drain valve ② at the bottom of the radiator and drain plug ③ on the side face of the cylinder block to drain the coolant.

4. After draining the coolant, close drain valve ② and drain plug ③, then fill with fresh water (city water).

5. When the radiator is full, open drain valve ② and drain plug ③, then start the engine and run it at low idling.
   Keep the engine running at low idling and flush the system for 10 minutes.
   Adjust the flow of water filling the radiator and draining from the radiator so that the radiator is always full during the flushing operation. Be careful that the filler hose does not come out of the radiator water filler during the flushing operation.

6. After the flushing operation, stop the engine, drain the water from drain valve ② and drain plug ③, then close them.

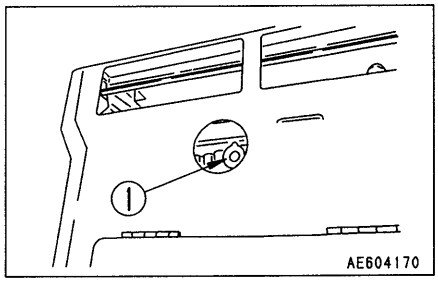
7. After draining the water, use a flushing agent and flush the system.
   For details of flushing the system, see the directions on the flushing agent.

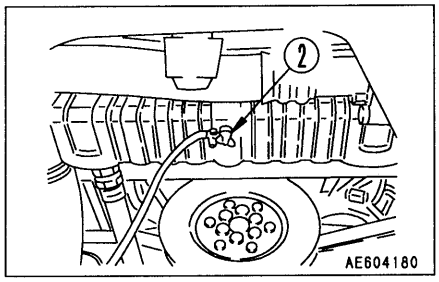
8. After flushing, open drain valve ② and drain plug ③, drain all the water out of the system, then close them and fill with fresh water (city water) up to near the water filler port.

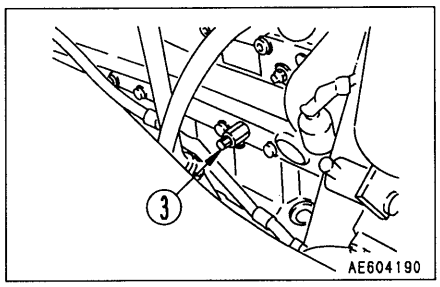
9. When the radiator is full, open drain valve ② and drain plug ③, then start the engine, run at low idling, and continue until clean water comes out.

   Adjust the flow of water filling the radiator and draining from the radiator so that the radiator is always full during the flushing operation.

10. When clean water comes out, stop the engine, and close drain valve ② and drain plug ③.







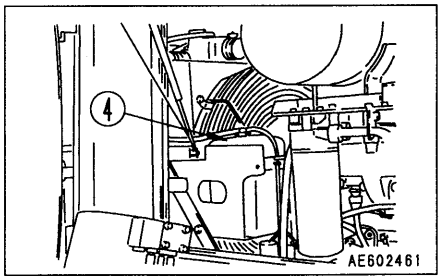
11. Replace the corrosion resistor cartridge and open the lever.
    For details of replacement of the corrosion resistor, see "23.8 EVERY 1000 HOURS SERVICE".

12. Add fresh water (city water) to the radiator until the water overflows from the water filler.

13. To remove any air in the cooling water, run the engine at low idling for 5 minutes, then run it for another 5 minutes at high idling.
    (When doing this, leave the radiator cap off.)

14. Drain the cooling water inside sub-tank ④, flush the inside of the sub-tank, then add water to a point midway between the FULL and LOW marks.

15. Stop the engine, wait for approx. 3 minutes, then add fresh water up to near the water filler port. After filling the radiator, tighten the cap.



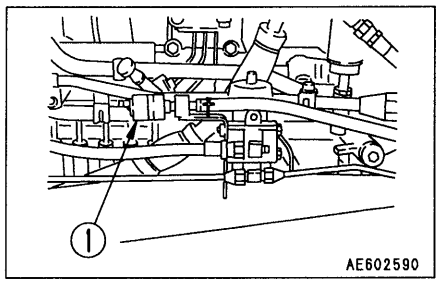
23.2.5 CHECK AIR CLEANER, CLEAN, REPLACE

⚠ WARNING

- **Never clean or replace the air cleaner while the engine is running.**
- **When using compressed air to clean the element, there is danger that dust will fly and get into your eyes, so always wear protective glasses.**

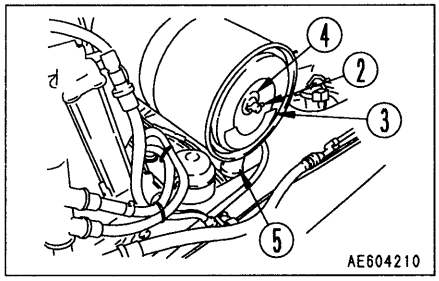
Checking

If dust indicator ① shows red, clean the air cleaner element.



Cleaning or replacing element

1. Remove the cover of the air cleaner.
2. Remove the wing nut ②, then remove the element ③.
3. Clean the inside of the body and the cover.
4. Clean and check the element.
5. After cleaning the element, install it again.
6. Press the button of dust indicator ① to return the red piston to its original position.



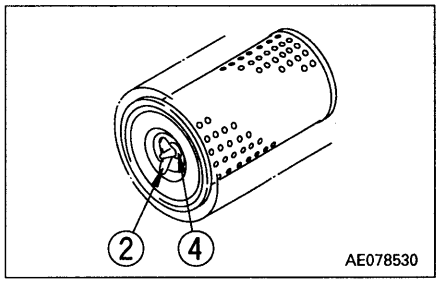
When checking and cleaning the air cleaner, remove vacuator valve ⑤, and blow with compressed air to clean.

Replace any element which has been cleaned 6 times or used for one year.

Replace the element if the dust indicator shows red immediately after the element is cleaned even if the element has not been cleaned 6 times.

If seal washer ④ is damaged or the thread of wing nut ② is damaged, replace with new parts.

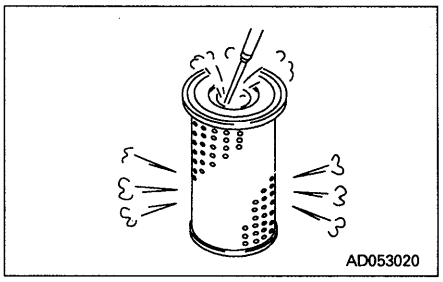
Never clean or replace the air cleaner while the engine is running.



Method of cleaning element

- When using compressed air

Direct dry compressed air (below 0.7 MPa (7 kgf/cm²)) from inside of the element along its folds. Then blow with air along the folds from the outside, and finally blow again from the inside.

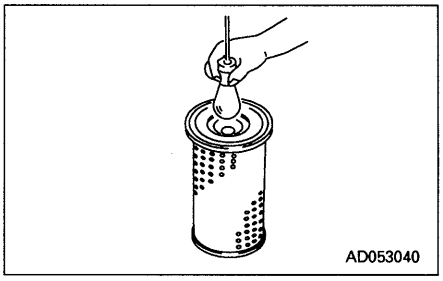


NOTICE

After cleaning the element, shine an electric bulb from the inside and check if any small holes or thin parts are found on the element. If such parts are found, replace the element.

When cleaning the element, do not hit it or beat it against anything.

Do not use any element whose folds or gasket or seal are damaged.

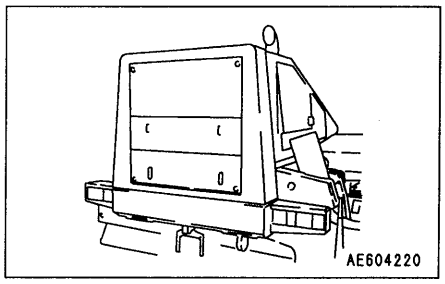


23.2.6 CLEAN RADIATOR FINS, CHECK

⚠ WARNING

Do not let compressed air, steam, or water hit directly against your body. There is danger of injury. Always wear protective glasses, mask, and safety boots.

1. Remove the panel rear of the radiator grills.
2. Use compressed air to blow off the mud, dirt, or leaves clogging the radiator fins.
   Steam or water may be used instead of compressed air.
3. Check the rubber hoses and if any hoses are found to be cracked or deteriorated, replace them. Check also for loose hose clamps, and tighten them.



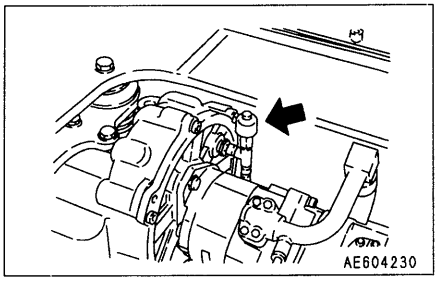
NOTICE

When using compressed air, stand at a distance from the radiator to prevent damage to the fins. If the fins are damaged, this will cause water leakage and overheating.

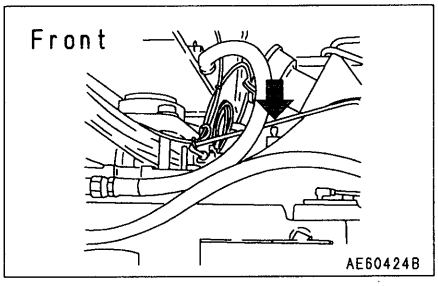
23.2.7 CLEAN BREATHER

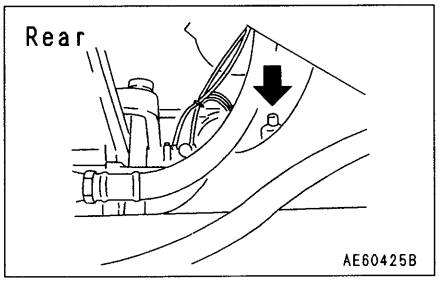
Remove the breather and rinse it in clean diesel oil to remove the dirt.

1. Transmission case breather



2. Differential gear case breather





23.2.8 CLEAN HYDRAULIC TANK CAP ELEMENT

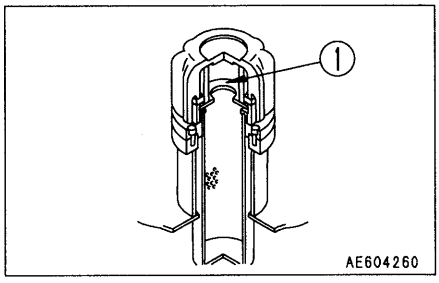
⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.
When taking off the oil filler cap, turn it slowly to release the internal pressure before removing it.

Carry out this operation if mud or dirt are stuck around the breather.

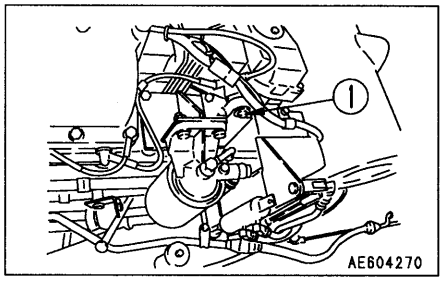
Remove the cap, then remove plate ①, take out the element, and clean it.

Replace the element if it is excessively dirty.



23.2.9 CHECK ELECTRICAL INTAKE AIR HEATER

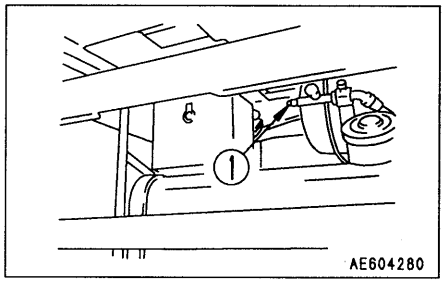
Check the heater once a year before the cold season starts.
Remove electrical intake air heater ① from the engine intake manifold, and check for disconnections or dirt.
When checking and installing the electrical intake air heater, replace the gasket with a new part.



23.2.10 CHECK AIR TANK SAFETY VALVE

Pull release pin ① by hand to check that there is no problem in operation caused by clogging with dirt.
The pin should move lightly and air should blow out.

Set pressure: 0.95 ± 0.04 MPa (9.5 ± 0.4 kgf/cm^2)

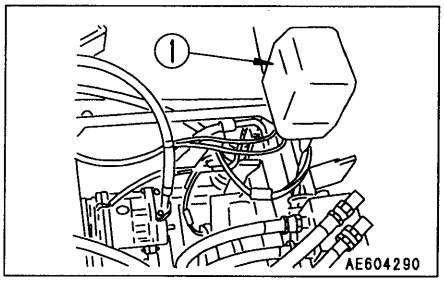


23.2.11 CHECK WINDOW WASHER TANK, ADD FLUID

Carry out this check if air comes out in the washer fluid or if no fluid comes out at all when the washer switch is pressed.
If no washer fluid comes out when the washer switch is pressed, check washer tank ① and add window washer fluid if necessary.

NOTICE

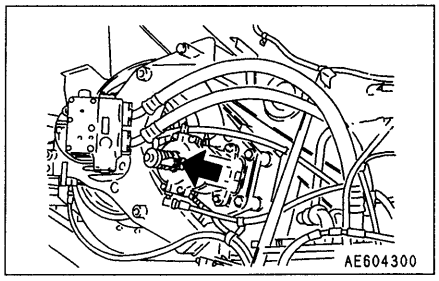
To prevent clogging of the nozzle, do not use soapy water as the window washer fluid.



23.2.12 ADJUST WINCH BRAKE

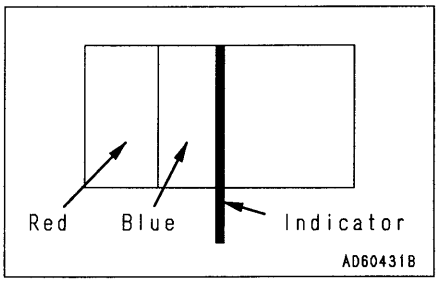
If the brake lining is worn or the clearance between the lining and the drum is not correct, there will be loss of braking force and it may be impossible to carry out free-fall operations smoothly.

Adjust the winch brake as follows.



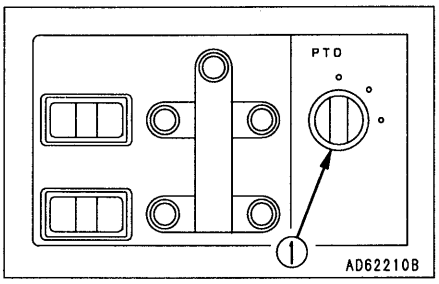
Checking

If the winch brake indicator is in the red range, adjust the winch brake.

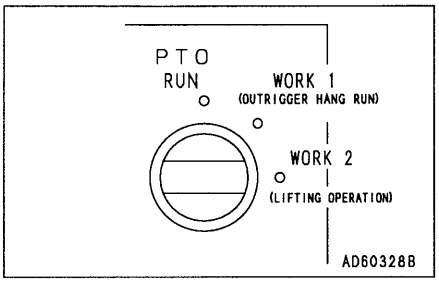


Adjusting

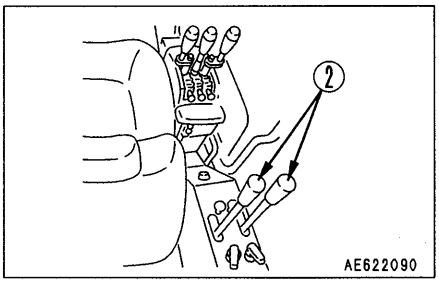
1. Start the engine and set PTO switch ① to the "Operation 2" position.



2. Lay the hook on the ground, then lock the drum with the drum lock lever.



3. Depress the winch break pedal and release the break interlock, then set clutch levers ② to the OFF position.



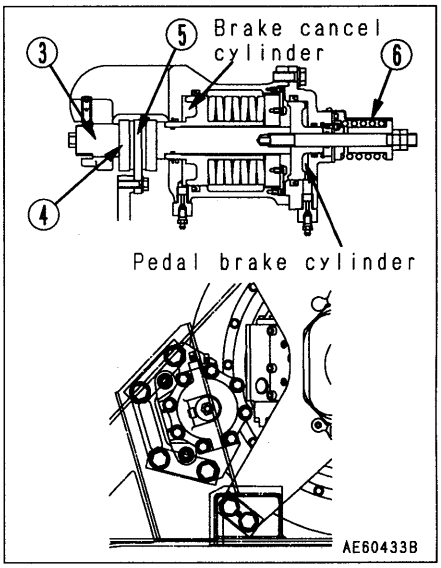
4. Turn to right the adjust screw ③ until the clearance between the pad ④ and the disk ⑤ is "0".

5. From the state of "4.", return the adjust screw ③ by 3 – 4 divisions (turn to left), and adjust the clearance between the pad ④ and the disk ⑤ to 0.45 – 0.6 mm (0.017 – 0.024 in). (Turning the adjust screw 1 turn (10 divisions) move 1.5 mm (0.06 in).)

6. Set the clutch lever ① to "ON" and adjust the mark plate ⑥ so that the indicator is in the black range.

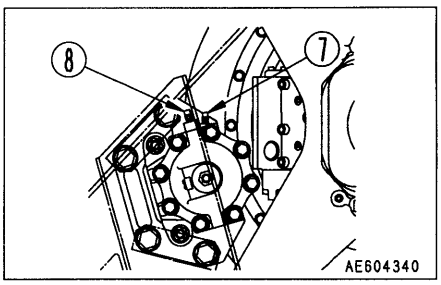
7. Set the drum lock lever to FREE and check the winck break effect of both main and auxiliary break.

8. If the break drugs, check the clearance between the pad ④ and disk ⑤ again. If the clearance is less, adjust it according to the above procedure again.



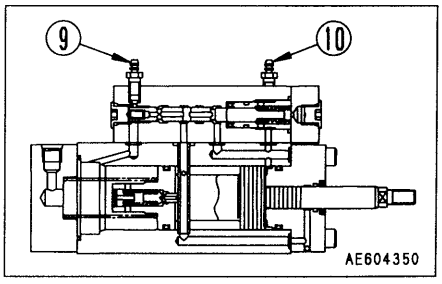
9. If the brake drags, bleed the air from the brake cancel cylinder as follows.
   Carry out the same procedure for both the main winch and auxiliary winch.

   (1) Set the clutch levers to the ON position, remove the cap from air bleed plug ⑨, then insert a vinyl tube and put the other end in a glass container holding hydraulic oil.
   (2) Paying attention to the position of the hook, use the winch control lever to wind out the hook.
   (3) Loosen air bleed plug ⑦ and bleed the air from inside the cancel cylinder.
   (4) When no more bubbles come out, tighten air bleed plug ⑦, fit the cap, then return the winch control levers to the neutral position.



10. If the load cannot be held by the winch brake pedal during free-fall operations, bleed the air from the brake cylinder as follows. Carry out the same procedure for both the main winch and auxiliary winch.

    (1) Lay the hook on the ground, then lock the drum with the drum lock lever.
    (2) Set the clutch levers to the OFF position, remove the cap from air bleed plug ⑧, then insert a vinyl tube and put the other end in a glass container holding hydraulic oil.
    (3) Depress the winch brake pedal, and loosen air bleed plug ⑧.
    (4) After bleeding the air, tighten air bleed plug ⑧, then release the winch brake pedal.
        Be careful not to let air get in when tightening the plug.
    (5) Repeat Steps (3) and (4) to bleed the air completely.
    (6) After bleeding the air completely, tighten the air bleed plug, return the clutch levers to the ON position and set the drum lock lever to the FREE position.



11. Use the same procedure to bleed the air from air bleed plugs ⑨ and ⑩ in the piping for the brake cancel air cylinder and brake air cylinder.

23.2.13 ADJUST WINCH CLUTCH

1. Wind the main hook out and lay it on the ground. Take care that the wire rope winds out neatly.

2. Lock the drum with the drum lock lever to prevent the drum from turning.

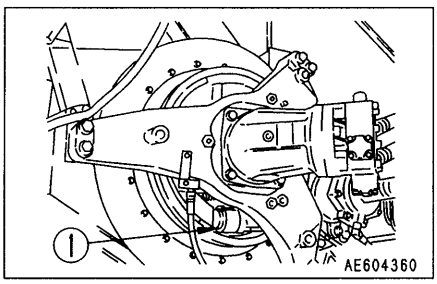
3. Release the lock for the main winch clutch lever and set it to the OFF position.

Adjusting

1. Turn adjustment nut ① of the clutch wheel cylinder fully in the direction to expand the shoe (clockwise).

2. From this condition, turn the adjustment nut back 4 clicks in the direction for contracting the shoe (counterclockwise) (One turn is 20 divisions).
   This will give a clearance between the shoe and drum of approx. 0.75 mm (0.03 in).

3. Adjust the two wheel cylinders in the same way.



Checking

1. Set the main winch clutch lever to the ON position.

2. Set the main winch lever to the WIND IN position and check that there is no slipping between the drum and clutch shoe.

3. Carry out the free-fall operation and check that the hook lowers freely.

REMARK

Use the same procedure to adjust the auxiliary winch clutch.

23.2.14 CLEAN THE AIR CONDITIONER CONDENSER

⚠ WARNING

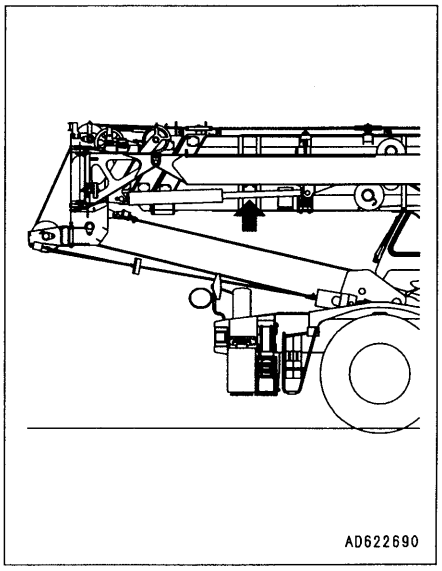
Do not clean the condenser using steam cleaner, because the condenser is heated and it is dangerous.

If mud sticks to the air conditioner condenser, the ventilating effect is down and it causes the cooling effect down. In that case, clean it or brush away. When cleaning with water, cover it with as vinyl.

23.2.15 GREASE JIB HOIST CYLINDER ROD PORTION

Apply grease to the jib hoist cylinder rod portion (marked arrow). Use the following bland depending on the greasing point.

For details of the oil to see, "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".



23.3 CHECK BEFORE STARTING

The items in this section are carried out once only before starting the engine for the first time each day.

23.3.1 GREASING

⚠ WARNING

Grease is collected and there is a fear to slip by adding grease more than needed. Add grease as much as grease do not drip. Apply the grease but not as much as to drop, and if it drops, wipe it off thoroughly.

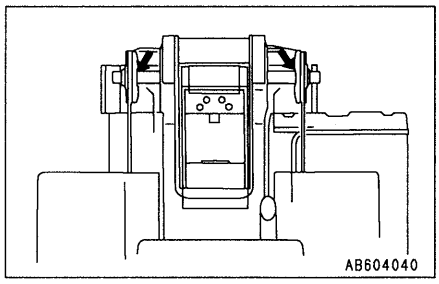
1. Using a grease pump, add grease through the grease fittings marked by arrows.

2. After greasing, wipe off any old grease that is forced out.

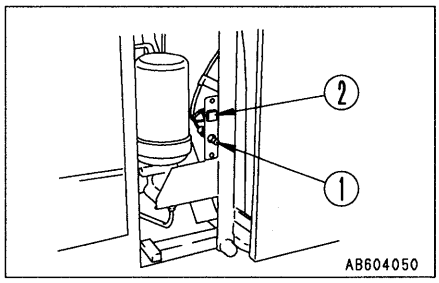
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Nippon Molybdenum	Nichimoly PC-1	1. Guide sheave
Dow Corning	Molycoat BR1-S	
Komatsu	G2-LI	2. Bottom centralized greasing point

1. Guide sheave (2 places)
   Slide so that the whole shaft of the guide sheave is coated with grease.



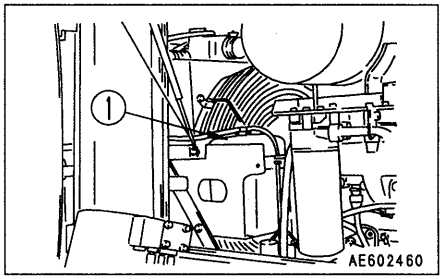
2. Bottom centralized greasing point (1 place)
- Tie rod pin
- King pin
- Steering cylinder pin
- Suspension cylinder pin
- Suspension spring hanger
- Suspension spring pin
- Rear steering lock pin



   (1) Push greasing switch ① at the side of the outrigger control panel on the left side of the machine.
   (2) Lamp ② above switch ① lights up to indicate that greasing is completed, but keep switch ① pressed for a further 2 – 3 seconds.

REMARK
- Check that there is grease in the grease cartridge before pushing the greasing switch.
- Always use the special cartridge for the grease.
- If the grease cartridge becomes empty, air will enter the piping. Replace the cartridge before this happens.

23.3.2 CHECK COOLANT LEVEL, ADD WATER

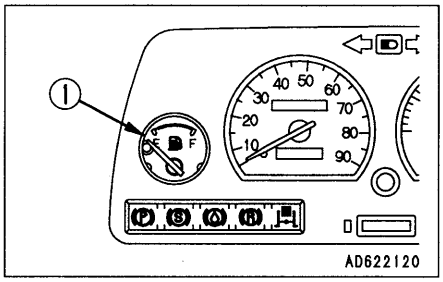


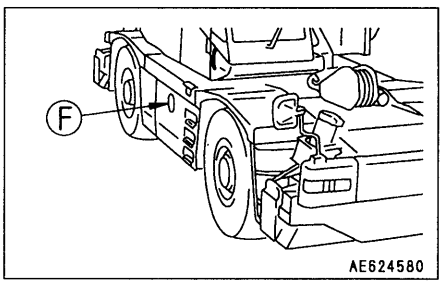
⚠ WARNING

Normally, do not open the radiator cap. When checking the coolant, always wait for the engine to cool down, and check the sub-tank.

1. Open the engine side cover at the right side of the machine, and check that the coolant is between the FULL and LOW marks on sub-tank ①. If the level is low, add water to the FULL level through the water filler of sub-tank ①.
2. After adding water, tighten the cap securely.
3. If the sub-tank is empty, check for water leakage, then check the level of the water in the radiator. If the level is low, add water to the radiator, then add water to the sub-tank.

23.3.3 CHECK FUEL LEVEL





⚠ WARNING

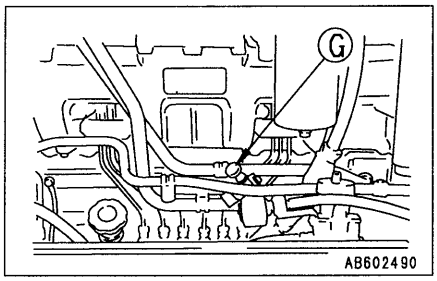
To prevent fire, make sure that the fuel does not overflow when you add fuel.

1. Check the fuel level on fuel gauge ①.
2. After completing operations, add fuel through fuel filler port Ⓕ to fill the tank.

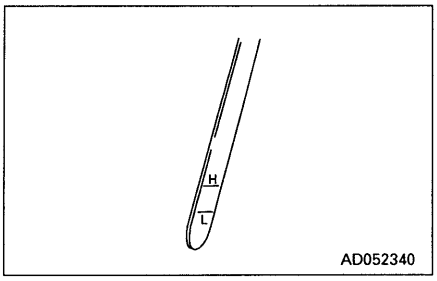
   For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".
3. After adding fuel, tighten the cap securely.

   Fuel tank capacity : 300 ℓ (79.2 US gal, 66 UK gal)

23.3.4 CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

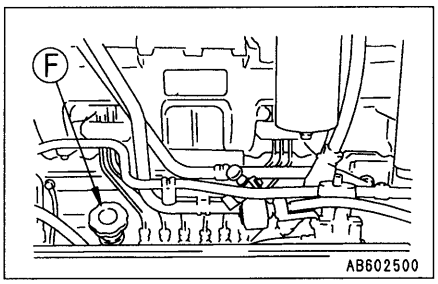


1. Open the right side cover of the engine.
2. Pull out dipstick Ⓖ and wipe the oil off with a cloth.
3. Insert dipstick Ⓖ into the oil filler guide again, then pull it out.
4. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler port Ⓕ. Swing the upper structure to the side when doing this.



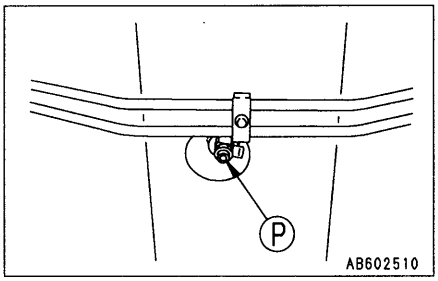
For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

5. If the oil is above the H mark, drain the excessive engine oil from drain plug Ⓟ, then check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely.



REMARK

- When checking the oil level after operating the engine, stop the engine, then wait for at least 15 minutes before starting to check. When checking, make sure that the machine is not at an angle. Set it horizontal, then check the oil level.
- When adding oil, remove dipstick Ⓖ from the gauge guide to release the air from inside the crankcase.



23.3.5 CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

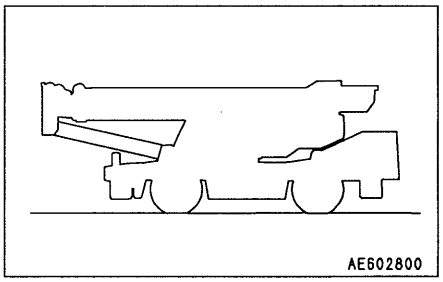
⚠ WARNING

- **When removing the oil filler cap, the oil may spurt out, so turn the cap slowly to release the internal pressure, then remove the cap carefully.**
- **When adding oil, if too much oil is added and the oil goes above the top line on the level gauge, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from drain plug Ⓟ.**

NOTICE

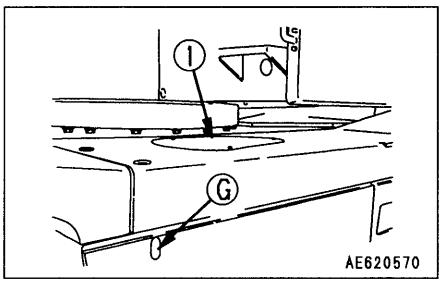
Do not add oil above the top mark. This will damage the hydraulic circuit and cause the oil to spurt out.

1. If the machine is not in the travel posture shown in the diagram on the right, start the engine, run the engine at low idling, set the machine to the travel posture, then stop the engine.
   For details of the travel posture, see "12.4 PREPARATIONS BEFORE MOVING MACHINE OFF".


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2. Check the oil level with sight gauge Ⓖ to confirm that it is between the top and bottom lines.

3. If it is below the bottom line, remove cover ① add hydraulic oil through oil filler port Ⓕ.

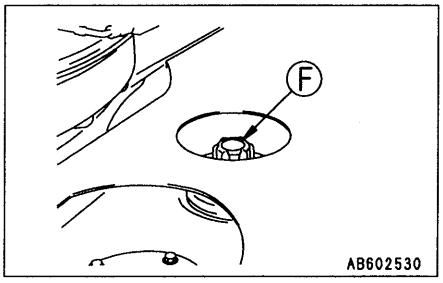


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When checking and refilling the hydraulic oil, please contact your Komatsu distributor.

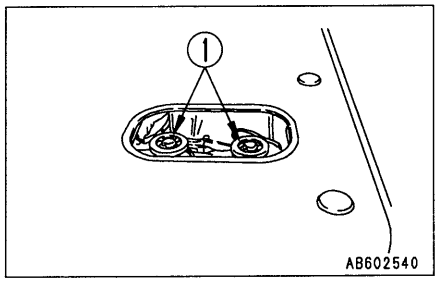
The recomended oil for HO46-HM

Supplier	Oil
Esso	Uni-power SQ46K
Mobil	Mobil DTE25
Shell	Hydroconto oil K



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23.3.6 CHECK TRAVEL BRAKE FLUID LEVEL, ADD FLUID



⚠ WARNING

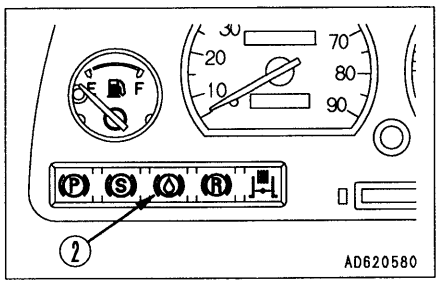
When adding brake fluid, be careful not to mix mineral oil with the brake fluid. Even if only a small amount of mineral oil (engine oil, etc.) is in the brake fluid, the rubber parts in the brake fluid line will show an abnormal change in their properties, and this will lead to defective operation of the brakes. When adding brake fluid, always use a container that is used exclusively for brake fluid.

1. Check that the fluid level is at the MAX level in brake fluid tank ① (2 places).

2. If it is not up to the MAX level, add brake fluid (FMVSS DOT5 <Glycol type> or equivalent).

NOTICE

If the fluid level is too low, check for damage of the break pad and break fluid leakage from the break pipes.



For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

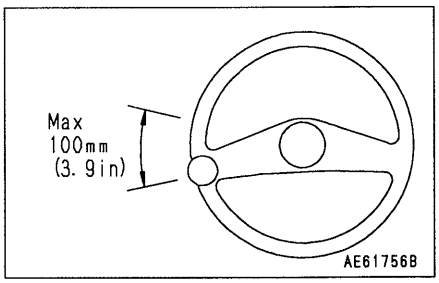
REMARK

If the fluid level is too low, brake oil level caution lamp ② in the meter portion lights up and the alarm buzzer sounds to warn.

NOTICE

When adding brake fluid, be careful not to get the brake fluid on any painted surface. The brake fluid may attack the paint.

23.3.7 CHECK PLAY OF STEERING WHEEL



When measuring the play of the steering wheel, start the engine, and jack up the front wheels before measuring.

Standard: Max. 100 mm (3.9 in)

If the play is not within the standard, or the steering wheel vibrates abnormally, or pulls or is heavy, please contact your Komatsu distributor for repair.

23.3.8 CHECK TIRE INFLATION PRESSURE

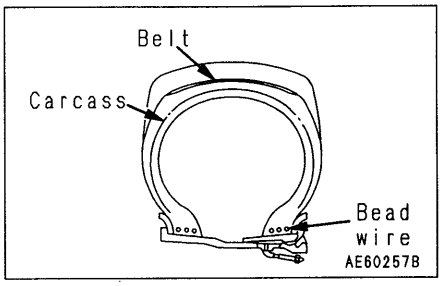
Measure the tire inflation pressure before starting operation when the tires are cold.
If the tire inflation pressure is too low, it will cause overload; if it is too high, it will cause cuts and shock bursts, so make sure that the tire inflation pressure matches the values in the table below.

	Inflation pressure
When traveling	0.9 MPa (9.0 kgf/cm^2)
When working	0.9 MPa (9.0 kgf/cm^2)

REMARK

If tires have any of the defects 1) to 5) listed below, they must be replaced with new tires to ensure safety.

1) Tires where the bead wire is cut, bent, or greatly deformed
2) Tires with advanced wear, which show signs of slipping
3) Tires where the carcass or belt are damaged
4) Tires in which the ply or belt has separated
5) Tires which show deterioration, deformation, or growth in damage, and which are judged to be unable to withstand use

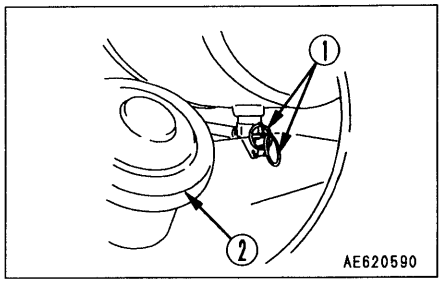


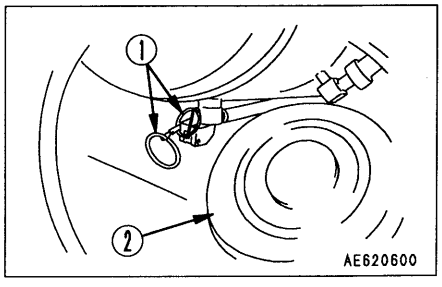
23.3.9 DRAIN WATER FROM AIR TANK

After finishing operations, stop the engine, then open ring ① in the dry tank and drain the water. In the same way, pull ring ② in the wet tank to drain the water.

NOTICE

For machines equipped with an air dryer, check what is drained. If there is an abnormal amount of water or oil, replace the desiccant in the dryer or check for oil leaking up from the air compressor.



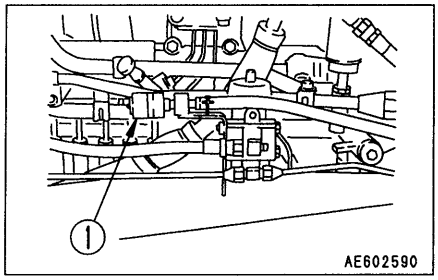


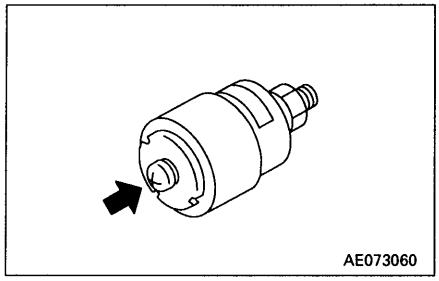
23.3.10 CHECK DUST INDICATOR

1. Check if the red piston has appeared in the clear portion of dust indicator ①.

2. If the red piston has appeared, immediately clean or replace the element.
   For details of the method of cleaning the element, see "23.2 WHEN REQUIRED".

3. After inspecting, cleaning, and replacing, press the knob of dust indicator ① to return the red piston to its original position.





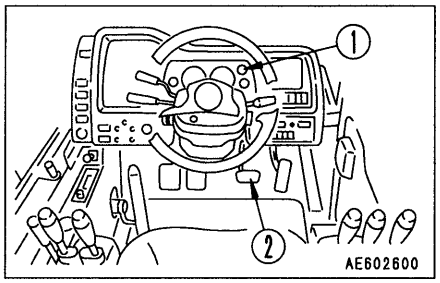
23.3.11 CHECK BRAKING EFFECT

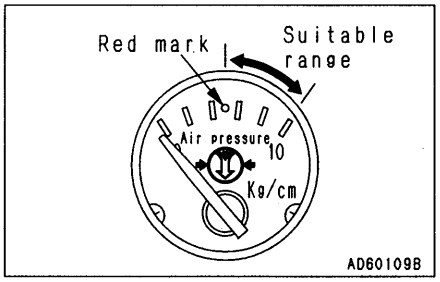
The stopping distance should be a maximum of 12 m (39 ft 4 in) when the machine travels at an initial speed of 35 km/h (22 MPH) on a flat, dry concrete surface.
If the braking effect is poor, see "23.6 EVERY 250 HOURS SERVICE".

23.3.12 CHECK RISE IN AIR PRESSURE, CHECK EXHAUST NOISE FROM BRAKE VALVE

When the pressure inside the air tank is 0, check that it takes approx. 5 minutes to charge with air up to the range marked by the arrow on air pressure gauge ① with the engine at low idling, and less than 1.5 minutes when the engine is running at high idling.

If the rise in pressure is too slow, check for any leakage from the piping, and check the operation of the air compressor. Check also that the exhaust sound is normal when air is exhausted from the brake valve when brake pedal ② is depressed and then released.





REMARK

When the pressure is lowering, the buzzer sounds and the lamp inside the monitor lights up.
In addition, when the needle of the air pressure goes over the red mark, the buzzer and the lamp go off.

23.3.13 CHECK FLASHING OF LAMPS, CHECK FOR DIRT, DAMAGE

23.3.14 CHECK DIRECTION OF BACKUP MIRROR, CHECK FOR DIRT OR DAMAGE

23.3.15 CHECK REFLECTORS AND NUMBER PLATE FOR DIRT OR DAMAGE

23.3.16 CHECK OPERATION OF HORN

23.3.17 CHECK ENGINE EXHAUST COLOR AND SOUND

23.3.18 CHECK OPERATION OF GAUGES

23.3.19 CHECK THAT ABNORMALITIES FROM PREVIOUS DAY HAVE BEEN REPAIRED

23.3.20 CHECK BRAKING EFFECT OF PARKING BRAKE

23.3.21 CHECK DOOR LOCK

23.3.22 CHECK OPERATION OF WIPERS, WINDOW WASHER, CHECK WASHER FLUID LEVEL

23.3.23 CHECK OPERATION OF STEERING MECHANISM

Check the turning of the steering wheel and the movement of the tires.

23.3.24 CHECK WIRE ROPE

Check the holder at the end of the rope, check the winding-on condition, and check for contact between ropes.

23.3.25 CHECK OUTRIGGER CHECK VALVE

Check that there is no hydraulic drift of the jack cylinder when the outriggers are extended.

23.3.26 CHECK OPERATION OF MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) PANEL

For details, see "12.35 SETTING MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)".

23.3.27 CHECK OPERATION OF WORK EQUIPMENT

Check that the winding in and winding out of the winch, and the hoist, telescoping, and swing movement of the boom, and tilting of the jib match the operation of the levers and pedals.

23.3.28 CHECK HOOK

Check the movement of the bearings, check for deformation of the hooks, check that the stopper for the wire rope is normal.

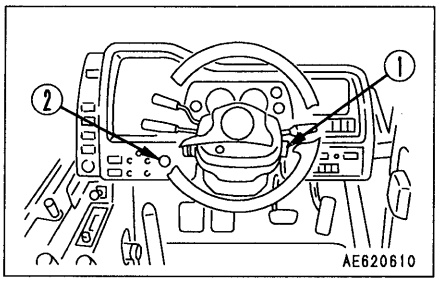
23.3.29 CHECK BRAKING EFFECT OF SWING BRAKE

23.3.30 CHECK MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

Check MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) operation as following procedures.

1. Turn the starting key ① to "START" position and start the engine.

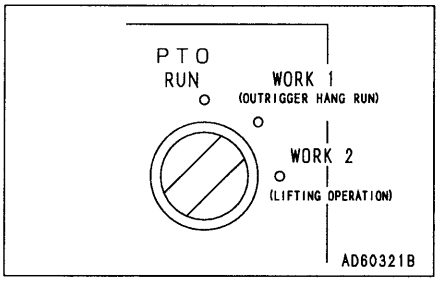
2. Set PTO switch ② to the "WORK 1" position. Power of MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) switch turns ON.
   - When the PTO switch is set to the "WORK 1" position, the ALARM buzzer (PEE sound) sounds for two or three seconds.)



3. Set the crane operating mode switch to "Boom" and the carrier operating mode switch to "Outrigger".

4. Slide the outrigger to the desired length and insert the lock pin.

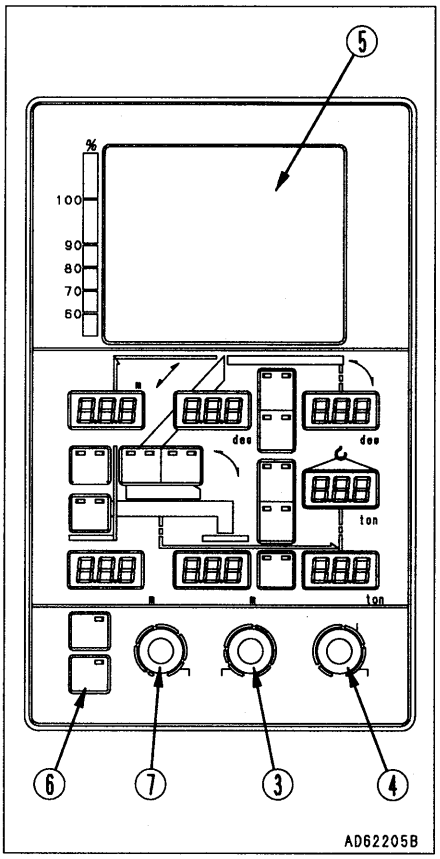
5. Follow the below items to check the outrigger extending width setting function.
   - Make sure that the lock pin position matches with the contents of the display on the panel.



6. Check the outrigger setting by pressing the "SET" switch.

7. Check the wire rope hook number setting by pressing the "SET" switch.
   - For the items 6 and 7, when the "Setting" switch is pressed, the ALARM buzzer (PEE sound) sounds.

8. To check the automatic stop function, set the display mode switch to the "CHECK" position, and operate the below levers to check the following items.
   1) When the switch is set to "Check", all display area of the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel light up and buzzer sounds, then all lit up area go out and the buzzer stops. After that (3 – 5 seconds later), the display returns to normal.
   2) Check the "Name of machine", "Outrigger type" and "Jib specification" displayed on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel.
   3) The boom does not go down even when the boom hoist lever is operated.
   4) The boom does not extend even when the boom telescope lever is operated.
   5) The winch does not wind in even when the winch control lever is operated.
   6) The tilt does not down even when the auxiliary jib hoist lever is operated.
      (Only for the power tilt jib type machine : Mount the jib before carry out the jib working.)



REMARK

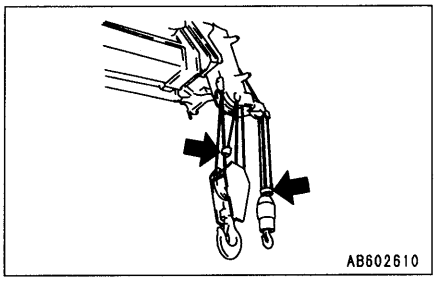
For items 3), 4), 5) and 6), operation to the reverse direction (safe side) is possible.

7) Check that the display area of the MOMENT LIMITER (OVER-LOAD PREVENTION SYSTEM) control panel is synchronized with the lever operation and is reversely displayed when operating each levers.
8) Check that the overwinding is reversely displayed when overwinding.
9) Check that the "Top Retract" stowing is normally displayed when extending the boom telescope cylinder.
10) Check that the automatic stop cancel is reversely displayed when canceling the automatic stop.

9. Set the display mode switch to "SWING" and use the following procedure to check that the display values of each sensors are normal.
   1) Check that the swing position display on the MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) control panel matches with the machine condition when swinging. And when in front, check that the front position is displayed.
   2) Check that the boom length display value is [7.6m (24 ft 11 in)] when the boom length is at the minimum.
   3) Check that the boom length display value is [32.0m (104 ft 11 in)] when the boom length is at the maximum.
      After ensuring the items 2) and 3) move down the boom at the proper angle and length, and stop to operate. (At this point, do not stop automatically with overloading.)
   4) Wind in the auxiliary hook to just before the overwind position, wind out the main hook to just before the grounding position, and check that the actual load weight display value is [0.2 $\pm^{0.2}_{0.0}$ ton] = main hook when without loading.

10. If the above items can not be checked, or the displayed value is out of the standard value, contact your Komatsu or Komatsu distributor.

23.3.31 CHECK FUNCTION OF SAFETY DEVICES (OVERWIND PREVENTION SYSTEM)



Check that winding stops automatically when the main and auxiliary hooks touches to the overwind weight. If it do not stop, always locate the cause and correct it.

23.3.32 CHECK BRAKING EFFECT OF WINCH BRAKE

Raise the maximum load for the number of lengths of rope, and check that it remains stopped when the clutch is disengaged.

23.3.33 CHECK EFFECT OF WINCH CLUTCH

Raise the maximum load for the number of lengths of rope, and check that the load can be raised and lowered.

23.3.34 CHECK ELECTRIC WIRING

⚠ WARNING

- **If the fuse blows frequently, or if there is any sign of a short circuit in the electric wiring, always investigate and repair the cause.**
- **If withered leaves, withered branches or withered grasses and other flammable things are collected around the battery, they could cause a fire. Always remove them thoroughly.**
- **Keep the upper face of the battery clean, and if any clogs with mud are found in the battery cab vent holes, wash them in water without soap and remove the clogs.**

Check for any damage to the fuse and for any sign of disconnections or short circuits in the electric wiring. Check also for loose terminals, and tighten if necessary.

Be particularly careful to check the following wiring.

- Battery
- Starting motor
- Alternator

Always check that there are no flammable things around the battery and remove them.

When investigating and repairing the cause, please contact your Komatsu distributor.

23.3.35 CHECK BOOM TELESCOPIC WIRE CABLE

Check the boom telescopic wire cable for the damage, abnormal slack, abnormal tension, incorrect retraction and extension of the boom etc.
Especially check the following:

- Damage to the telescopic wire cable
- Looseness of the fixing nuts at the end of the telescopic wire cable, etc.
- Slack or over-tension of the telescopic wire cable

After checking, if abnormalities are found, consult Komatsu or your Komatsu distributor.

23.3.36 CHECK BOOM SLIDE PADS

Check the boom for smooth operation by extending and retracting the boom.
Especially check the following:

- Make sure extending and retracting of the boom takes place smoothly.
- When extending the boom to the maximum, be sure there are no abnormal bends at the connection of boom sections.
- Check for abnormal flaws on the boom slide pad surface.

After checking, if abnormalities are found, consult Komatsu or your Komatsu distributor.

23.4 EVERY 50 HOURS SERVICE

23.4.1 GREASING

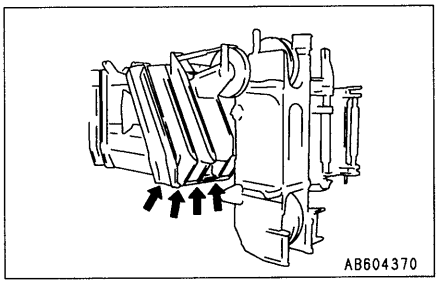
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.

2. After greasing, wipe off any old grease that is pushed out.

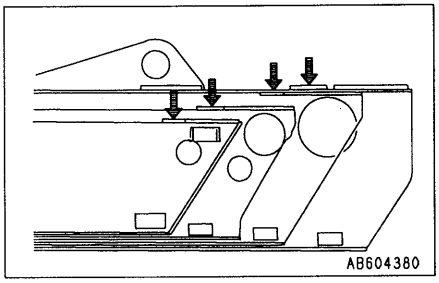
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Nippon Molybdenum	Nichimoly LW-1	1. 2nd, 3rd, 4th top boom bottom pads 2. Boom backward slide pads
Nippon Molybdenum	Nichimoly PC-1	3. Boom foot pin 4. Hoist cylinder rod pin 5. Hoist cylinder bottom pin
Dow Corning	Molycoat BR1-S	
Komatsu	G2-LI	6. Swing pinion 7. Swing circle

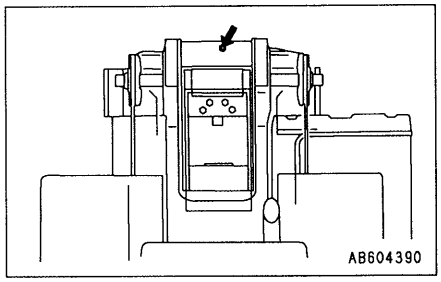
1. 2nd, 3rd, 4th, top boom bottom pads (8 places)
   Extend the outriggers, extend the boom horizontally or tilted to the front, and apply grease with a brush. Supply grease through the greasing hole in the bottom surface of the boom to fill the pad grease bath.



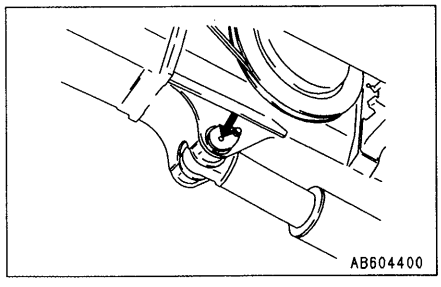
2. Boom backward slide pads (6 places)
   For the 2nd boom, supply grease to the grease bath in front of the pad.
   For the 3rd and 4th booms, supply grease through the top surface hole at the rear of the boom.
   For the top boom backward slide pad, extend the second boom to the maximum, remove the plugs (2 places) on the front top surface of the base boom, and then supply grease.



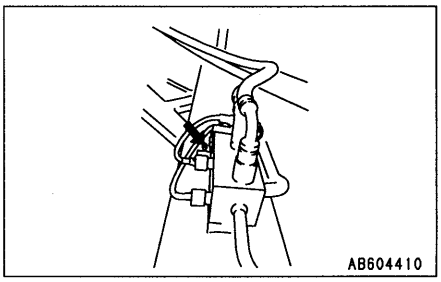
3. Boom foot pin (1 place)



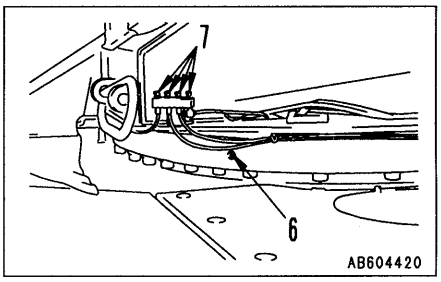
4. Hoist cylinder rod pin (1 place)



5. Hoist cylinder bottom pin (1 place)



6. Swing pinion (1 place)
7. Swing circle (4 places)

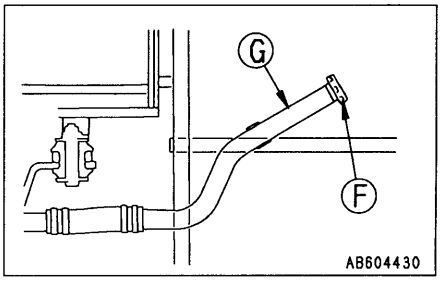


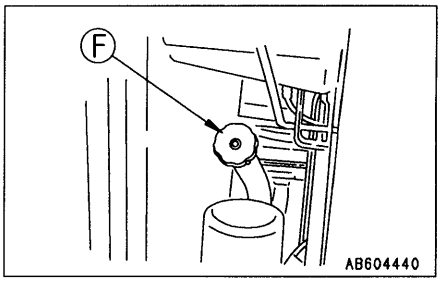
23.4.2 CHECK OIL LEVEL IN TRANSMISSION CASE, ADD OIL

1. Make the engine to the low idling and check the oil level with dipstick Ⓖ.

2. If the oil level is below the L mark, add engine oil through oil filler port Ⓕ.

For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".





REMARK

If the machine is at an angle, set the machine horizontal before checking the oil level. Swing the upper structure to the side before adding oil.

23.5 EVERY 100 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

23.5.1 GREASING

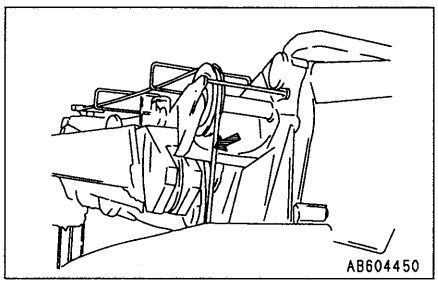
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.

2. After greasing, wipe off any old grease that is pushed out.

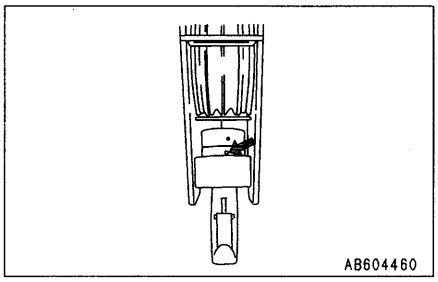
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Kokoku Wire Industres	Oil R#1	1. Wire rope
Komatsu	G2-LI	2. Main hook 3. Auxiliary hook

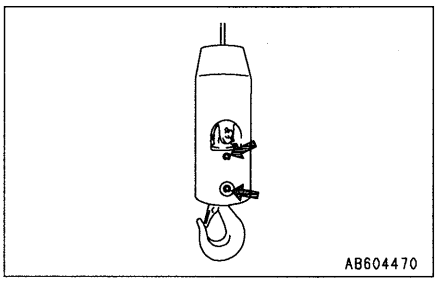
1. Wire rope (2 places)
   Coat the wire rope with red rope grease to prevent wear and rust. Remove the dirt from the surface of the rope first, then apply the grease with a brush.



2. Main hook (1 place)



3. Auxiliary hook (2 places)

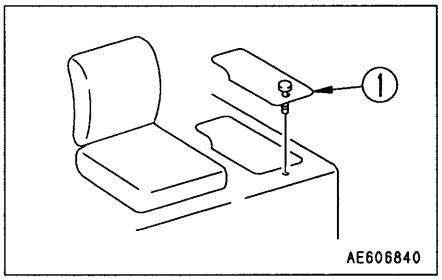


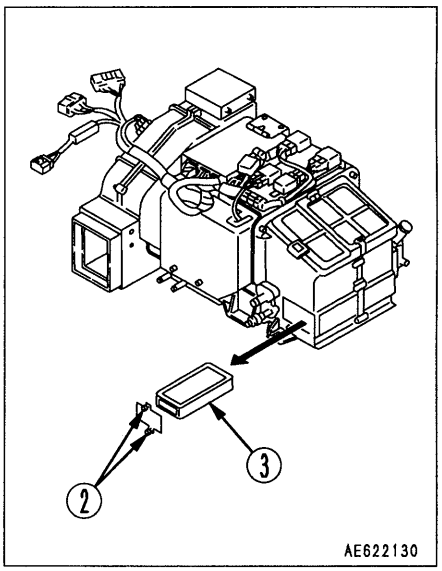
23.5.2 CLEANING AIR CONDITIONER OPEN AIR FILTER ELEMENT

⚠ WARNING

Wear the safety goggles when using pressurized air.

1. When cleaning the filter element, remove the cover ① at the side of the spare seat and remove two plungers ②, then pull out open air filter element ③ straightly.
2. Stop the air conditioner before cleaning the element.
3. Mount the element so that the arrow at the side of the element turns up.





23.6 EVERY 250 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

23.6.1 GREASING

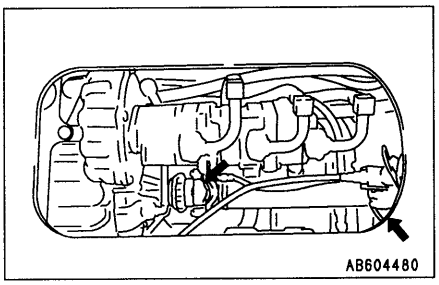
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.

2. After greasing, wipe off any old grease that is pushed out.

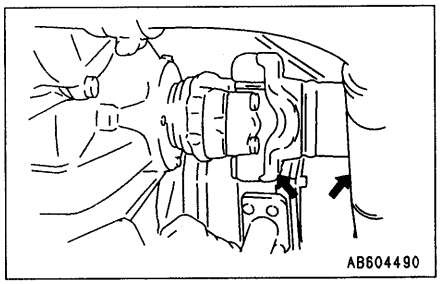
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Komatsu	G2-LI	1. Drive shaft 2. Axle joint
Nippon Molybdenum	Nichimoly PC-1	3. Clearance of suspension leaf spring plate 4. Outrigger beam (inner warp) 5. Outrigger float [X-shaped outrigger] 6. Outrigger support lever pin [X-shaped outrigger] 7. Outrigger jack cylinder trunnion pin [X-shaped outrigger] 8. Outrigger float [H-shaped outrigger] 9. Jib connecting pin 10. Top boom jib connecting pin hole 11. Jib extension linkage pin 12. Jib foot pin 13. Jib hoist cylinder pin 14. Telescope hose reel hose
Dow Corning	Molycoat BR1-S	

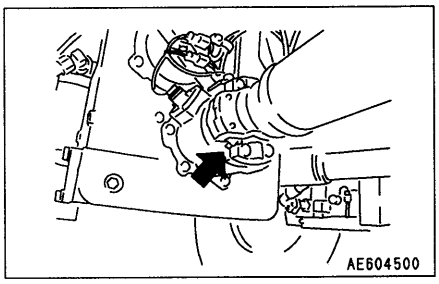
1. Drive shaft
   Damper – torque converter (2 places)



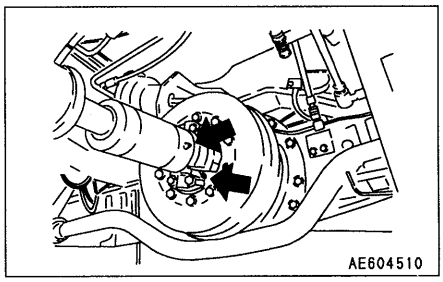
   Transmission – axle (rear) (2 places)

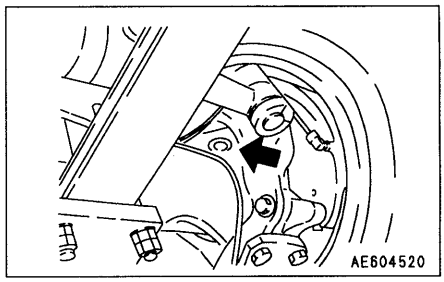


   Transmission – axle (front) (2 places)
   The retarder mounted machine has 4 greasing points of transmission – retarder – axle (front).

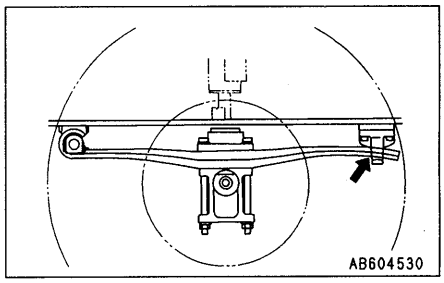


2. Axle joint (6 places)
Check the position of the grease fitting on the axle joint through the greasing hole and move the machine so that the grease fitting faces the greasing hole, then carry out the greasing.
(Front axle 4 places, rear axle 2 places)

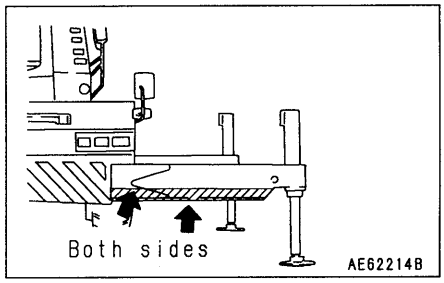




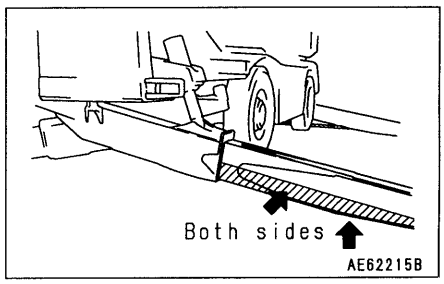
3. Clearance of suspension leaf spring plate (4 places)



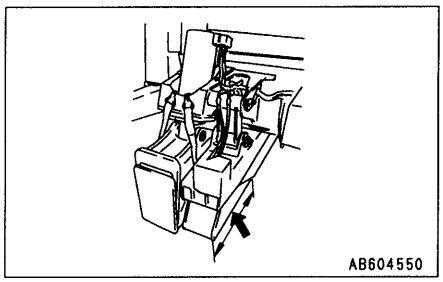
4. Outrigger beam (inner wrap) (4 places)
[H-shaped outrigger]



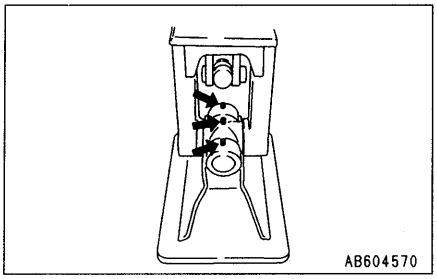
[X-shaped outrigger]
When the movement of the outrigger is not smooth, apply grease on the outrigger inner beam sliding part. Especially, apply grease in the depth fully.



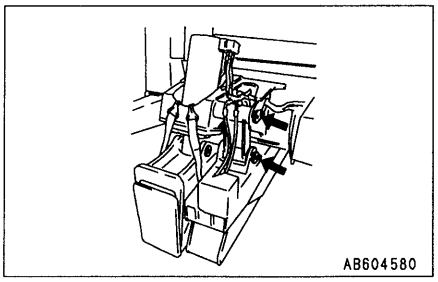
Just under the inner frame outs when storing.



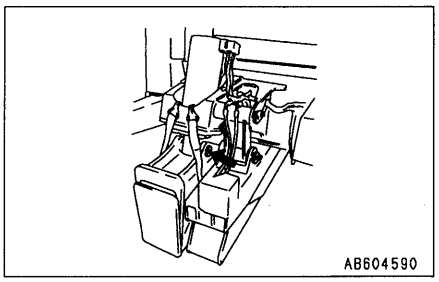
[X-shaped outrigger]
5. Outrigger float (12 places)



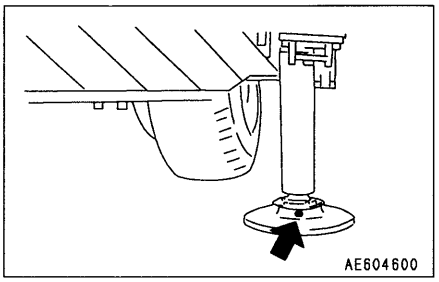
6. Outrigger support lever pin (8 places)



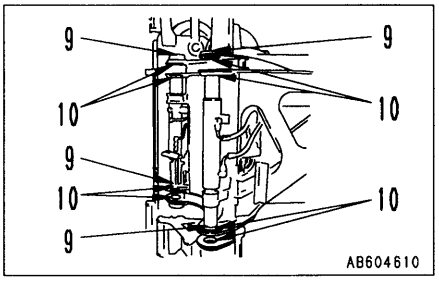
7. Outrigger jack cylinder trunnion pin (4 places)



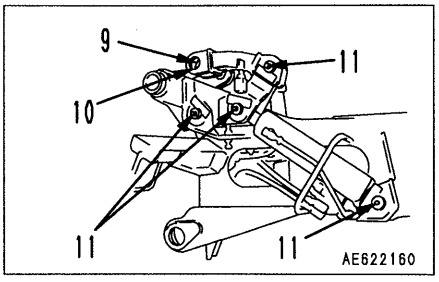
[H-shaped outrigger]
8. Outrigger float (4 places)



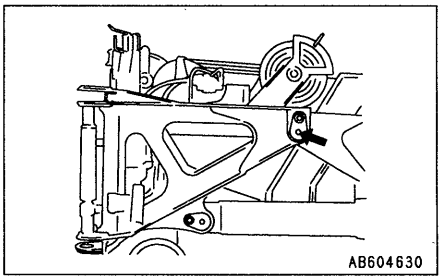
9. Jib connecting pin (5 places)
10. Top boom jib connecting pin hole (5 places)



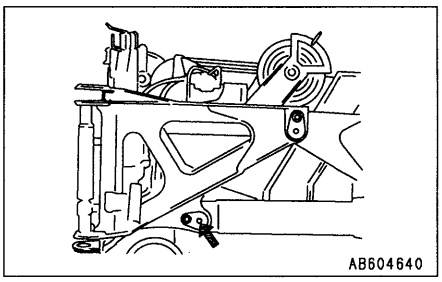
11. Jib extension linkage pin (4 places)



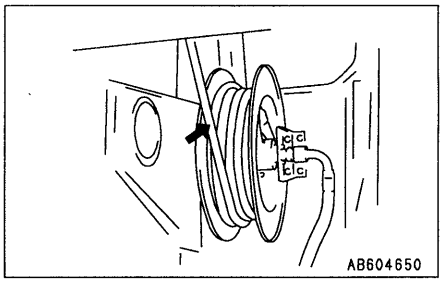
12. Jib foot pin (1 place)



13. Jib hoist cylinder pin (2 places)



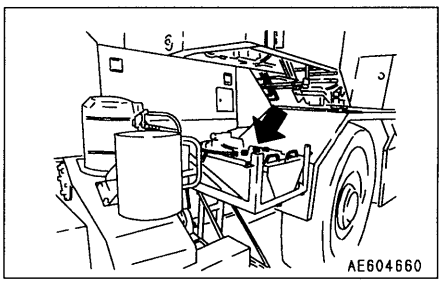
14. Telescope hose reel hose (1 place)
    Apply grease to hose reel using brush or cloth with extending the second boom.



23.6.2 CHECK BATTERY FLUID LEVEL

⚠ WARNING

- **The battery generates flammable gas so do not bring fire or sparks nearly battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skins, wash it off with large amounts of water, and consult a doctor.**



1. Remove the cap and check that the level of electrolyte.
   If it is not up to the UPPER LEVEL line, add distilled water.
   Do not add water above the UPPER LEVEL line. This may cause leakage of the electrolyte, which may lead to fire.

   If the battery electrolyte is spilled, have dilute sulfuric acid added.

2. Clean the air hole in the battery cap, then tighten the cap securely. Keep the upper face of the battery clean.

REMARK

When adding distilled water in cold weather, add it in the morning before starting operations to prevent the electrolyte from freezing.

23.6.3 CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

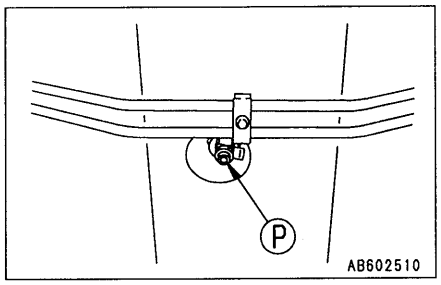
⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before changing the oil.

Prepare the following.
- Container to catch drain the oil: Min. 26 ℓ capacity
- Refill capacity: 26 ℓ (6.86 US gal, 5.72 UK gal)
- Filter wrench

Swing the upper structure to a position where the engine hood can be opened.

1. Set a container immediately under drain plug Ⓟ to catch the oil that is drained.

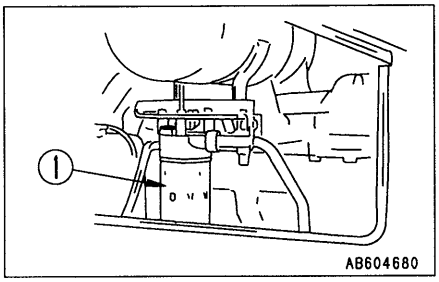


2. Remove drain plug Ⓟ and drain the oil.

3. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.

4. Tighten drain plug Ⓟ.

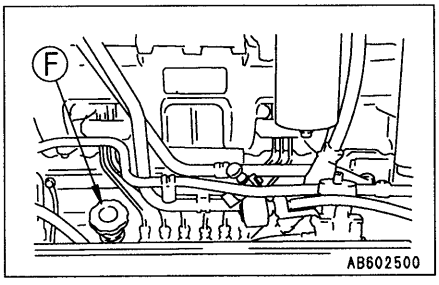
5. Using a filter wrench, turn filter cartridge ① counterclockwise to remove it.
   If the filter cartridge is removed immediately after the engine is stopped, a large amount of oil will come out, so wait for 10 minutes before removing it.



6. Clean the filter holder, coat the seal surface of the new filter cartridge with engine oil (or coat it thinly with grease), then install it to the filter holder.

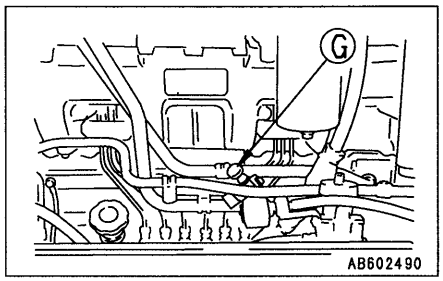
7. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it a further 3/4 – 1 turn.

8. After replacing the filter cartridge, add engine oil through oil filler Ⓕ to the specified level.



For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

9. Run the engine at idling for a short time, then stop the engine, and check that the oil is up to the specified level on dipstick Ⓖ. For details, see "23.3 CHECK BEFORE STARTING".

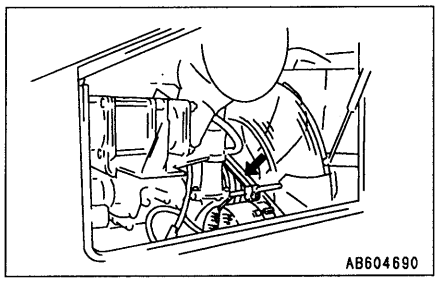


NOTICE

Even if the machine has not been operated for 250 hours, the oil and filter cartridge must be replaced when the machine has been operated for 6 months.

In the same way, even if the machine has not been operated for 6 months, the oil and filter cartridge must be replaced when the machine has been operated for 250 hours.

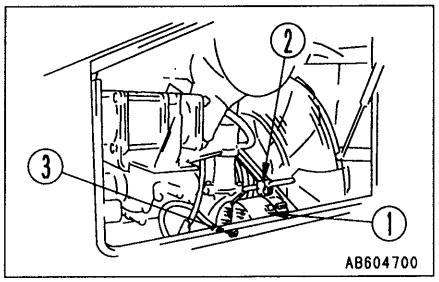
23.6.4 CHECK FAN BELT TENSION, ADJUST



Checking

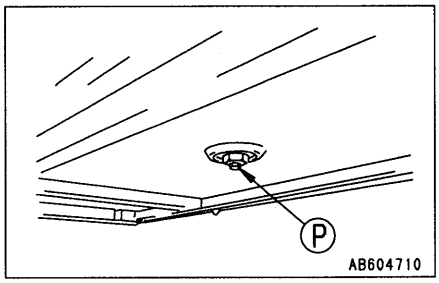
The belt should deflect by approx. 10 mm (0.4 in) when pressed with the finger (with a force of approx. 6 kg) at a point midway between the fan pulley and alternator pulley.

Adjusting



1. Insert a bar between alternator ① and the cylinder block to fix alternator ① in position.
   When fixing the alternator in position, insert a wooden block between the bar and alternator ① to prevent damage to the alternator.
2. Loosen bolts and nuts ② and ③.
3. Move alternator ① with the bar so that the deflection of the belt is approx. 10 mm (0.4 in) (approx. 6 kg).
4. Tighten the bolts and nuts ② and ③ to fix alternator ① in position.
5. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.
6. Replace the belt if it has stretched and has no allowance for adjustment, or if there are any cuts or cracks in the belt.
   When replacing any belt, replace all the belts as a set.
7. If the belts have been replaced, operate the machine for one hour, then check and adjust again.

23.6.5 DRAIN WATER AND DEPOSIT IN THE FUEL TANK



1. Carry out before starting the machine.
2. Prepare the container for receiving the drained fuel.
3. Remove drain plug ⓟ at the bottom of the tank and drain water and deposit together. Be careful not to be poured them.
4. When drained fuel changes to clean, tighten drain plug ⓟ.

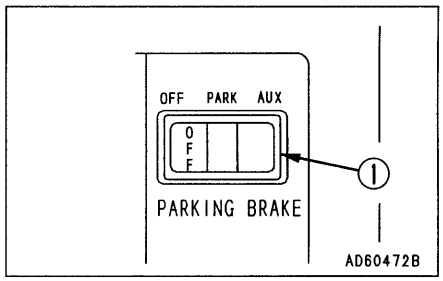
23.6.6 CHECK BRAKING EFFECT OF PARKING BRAKE, ADJUST

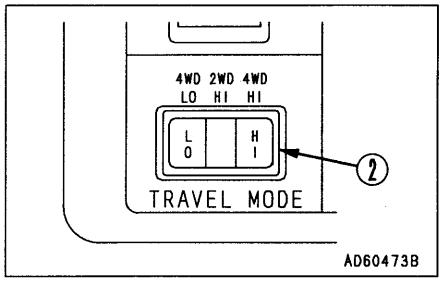
NOTICE

When checking the braking effect of the parking brake, a large force is applied to the drive system, and as the same time, excessive force is applied to the transmission, so do not carry out this operation more than necessary.

Checking

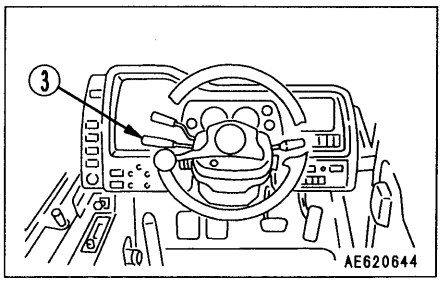
1. Set parking brake switch ① to the PARK position and travel mode selector switch ② to the Hi MODE position, and check that the parking brake indicator lamp lights up.





2. Set gear shift lever ③ to the D or L position.

3. Check that the machine does not move off even when the accelerator pedal is depressed.



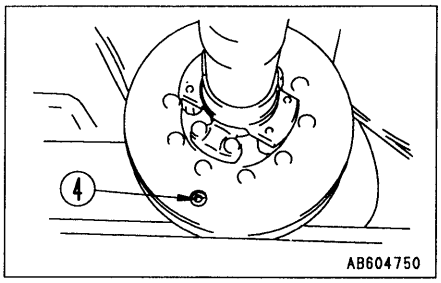
REMARK

The machine may move slightly, but this does not indicate any abnormality.

Adjusting

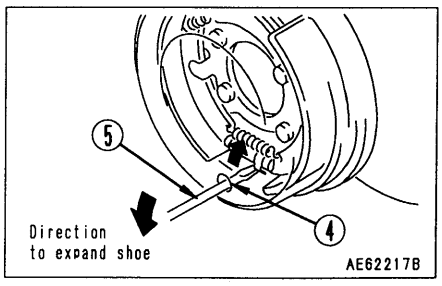
If the braking effect is poor, adjust as follows.

1. Move the machine so that brake drum adjustment hole ④ is approx. 15 mm (0.6 in) to the right of the point directly under the center. The brake drum rotates one turn if the machine is moved approx. 26.3 cm (10.4 in).

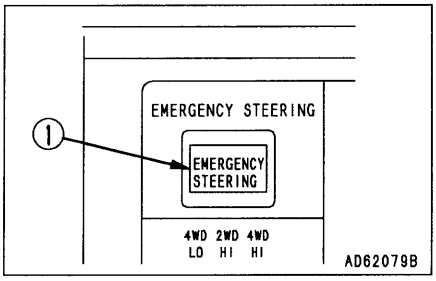


2. Insert screwdriver ⑤ through adjustment hole ④, and push down on the handle of the screwdriver to rotate the adjustment screw in the direction to expand the shoe. After bringing the shoe into tight contact with the drum, turn back 8 notches. (This will give a shoe clearance of 0.23 mm (0.01 in).)

3. After adjusting, travel for approx. 500 m (1640 ft), and check that the temperature of the drum is not higher than the temperature of the neighboring drive shaft to confirm that the brake is not dragging.



23.6.7 CHECK OPERATION OF EMERGENCY STEERING SYSTEM

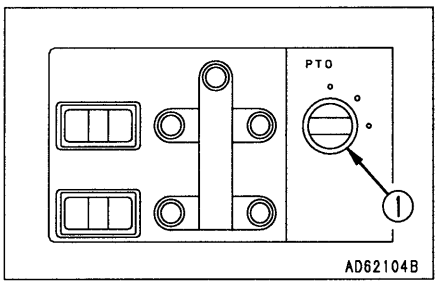


⚠ WARNING

Do not use the emergency steering continuously for more than 5 minutes.

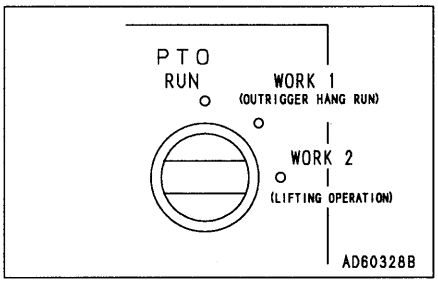
1. Stop the engine, press emergency steering switch ①, and check that the pilot lamp inside the switch lights up.
2. Turn the steering wheel and check that it can be operated for 20 seconds.
3. Press emergency steering switch ① and check that the lamp goes out.

24.6.8 CHECK BRAKING EFFECT OF WINCH BRAKE, ADJUST



Checking

1. Set PTO switch ① to the "WORK 2" position.
2. Depress main winch brake pedal ②, set main winch clutch lever ③ to the ON position, then operate main winch control lever ④ to the WIND OUT position, and check that the main winch hook does not move.
   Carry out the same procedure for the auxiliary winch brake.

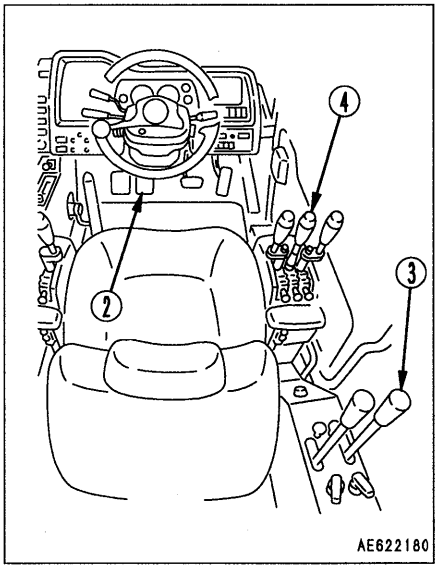


Adjusting

If the braking effect is poor, there is moisture on the band, so after depressing the brake pedal, operate in the WIND OUT and WIND IN directions and check that there is no slipping.

NOTICE

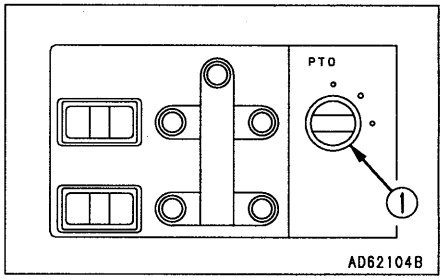
Check the winch brake also when a heavy load is raised.

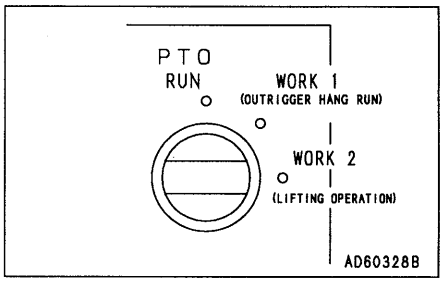


23.6.9 CHECK EFFECT OF WINCH CLUTCH, ADJUST

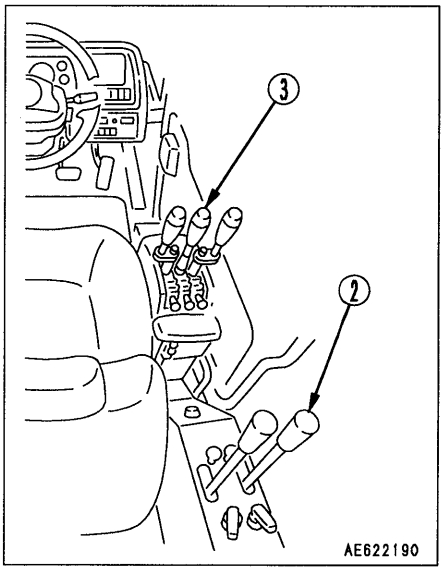
Checking

1. Set PTO switch ① to the "WORK 2" position.





2. Set main winch clutch lever ② to the ON position, then set main winch control lever ③ to the WIND IN position and check that the main hook is wound in.
   Carry out the same procedure for the auxiliary winch clutch.



Bleeding air

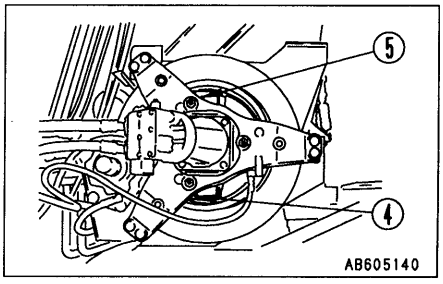
If the hook does not wind in, bleed the air as follows.

1. Remove the cap from air bleed plug ④ of the main winch clutch cylinder (lower), then insert a vinyl tube and put the other end in a glass container holding hydraulic oil.

2. Loosen air bleed plug ④.

3. Set the main winch clutch lever to the ON position and check the bubbles in the brake fluid and hydraulic oil.

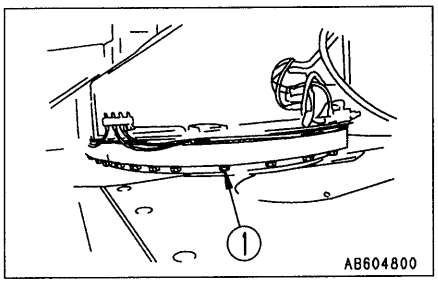
4. When no more bubbles are seen, tighten air bleed plug ④, fit the cap, then return the main winch clutch lever to the OFF position.

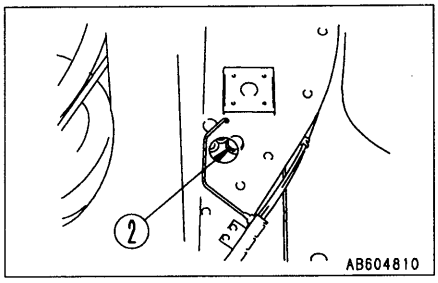


Bleed the air in the same way from air bleed plug ⑤ of the main winch clutch cylinder (upper).

Bleed air for the auxiliary winch clutch cylinder as the same procedure as the above.

23.6.10 CHECK FOR LOOSE SWING CIRCLE MOUNTING BOLTS, TIGHTEN





1. Check that there is no looseness in swing circle mounting bolts ① and ②.

2. If any looseness is found, tighten as follows.

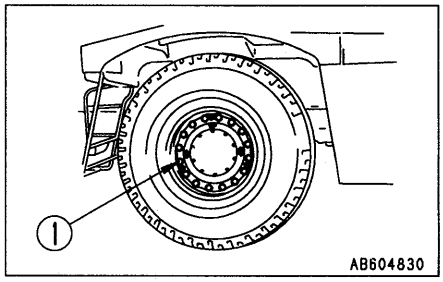
- When tightening bolt ②, remove upper body work cover and the blind cover.

- When tightening, insert a handle in the socket wrench and use a bar.

- When tightening the upper mounting bolts, swing the upper structure while tightening.

  Tightening torque: 926 ± 103N•m (94.5 ± 10.5 kgf•m)

23.6.11 CHECK FOR LOOSE WHEEL HUB BOLTS, NUTS, TIGHTEN



⚠ WARNING

If the wheel hub bolts or nuts ① are loose, this may lead to premature wear of the tires or serious accident, so always check that there are no loose nuts or bolts.

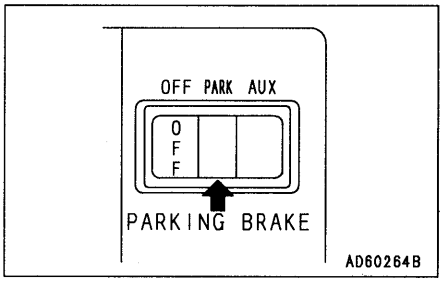
NOTICE

Even if it appears that there are no loose nuts or bolts, always check every nut and bolt. Check also that there is no damage to the rim. If any hub bolt is broken, replace all the bolts for that wheel.

1. Set the parking brake switch to the PARK position to apply the parking brake.

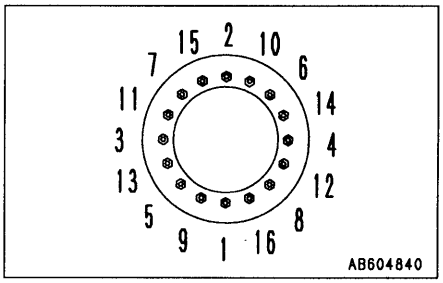
2. Fit a socket wrench and bar to the wheel hub bolts and nuts ①, and turn in the tightening direction to tighten the bolts and nuts.

Tightening torque: 549 ± 59N•m (56 ± 6kgf•m)



NOTICE

After replacing the wheel, tighten the nuts in the order shown in the diagram on the right. Use three passes to tighten to the specified torque, then travel for 20 to 40 km, and tighten again to the specified torque.

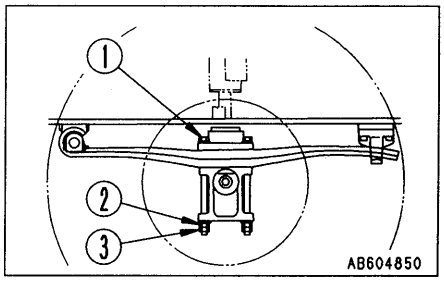


23.6.12 CHECK LEAF SPRING, TIGHTEN

Check for any looseness in bolt ①, and nuts ② and ③ tightening the leaf spring. Tighten if they are loose.

When tightening, insert a handle in the socket wrench and use a bar.

Tightening torque: 627 ± 59N•m (64 ± 6kgf•m)



23.6.13 CHECK DRIVE SHAFT

Check when greasing the drive shaft.
Check for any abnormalities, such as looseness of the drive shaft connection, play in the spline or bearing, or vibration of the shaft.

If the play or vibration is excessive and it is considered to be abnormal, contact your Komatsu distributor for inspection.

23.6.14 CHECK FOR DAMAGE TO ANY STRUCTURE

Check for any damage to the welded structural parts of the boom and outrigger. Check the following parts in particular.

- Tip of boom
- Root of boom
- Outer opening of outrigger

23.6.15 CHECK FOR WEAR OF DISC BRAKE PAD

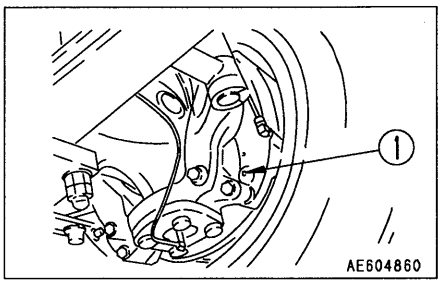
⚠ WARNING

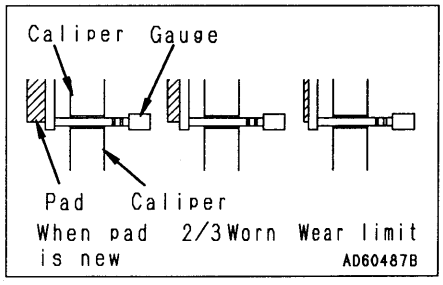
If discs are used when they have exceeded the wear limit, this will result not only in damage to the disc, but there is also danger that the brakes may not work. To prevent this problem, check the wear frequently when it is near the wear limit and replace the pad at the proper time.

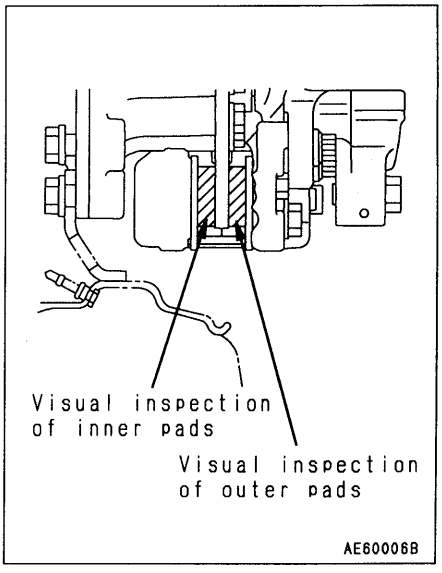
NOTICE

- **The wear of the pads on the front, rear, left, and right wheels is not necessarily the same, so always check the pads at all places.**
  If any one of the pads has reached the wear limit, always replace all the pads, or replace the set of 8 pads for the front wheel or the set of 4 pads for the rear wheel separately.
- **If it is considered that the wear will exceed the wear limit before the next inspection (250 hours), inspect the wear every 50 hours.**

1. Extend the outriggers fully and lock the suspension lift.
2. Set the steering mode switch to the "4 wheel" position and turn the steering wheel fully to either the left or right.
3. Insert an inspection gauge through wear inspection hole ① in the caliper to check the wear.
4. If the head of the inspection gauge is at the inlet port of the hole, the wear limit has been reached, so replace the pads.
   If the result of the inspection shows that the pads must be replaced, contact your Komatsu distributor for replacement.
5. Inspect the outer pads visually (compare with the inner pads wear status).
   If it reaches the wear limit, replace the pads.
   If the result of the inspection shows that the pads must be replaced, contact your Komatsu distributor for replacement.







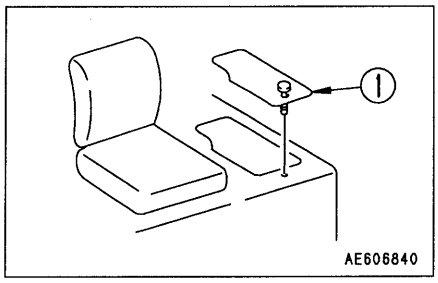
23.6.16 CLEANING AIR CONDITIONER INSIDE AIR FILTER ELEMENT

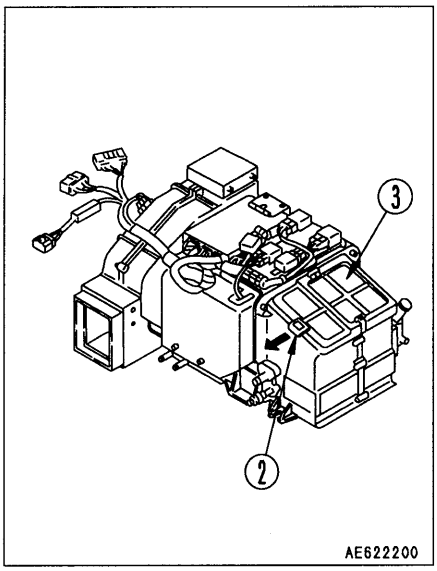
⚠ WARNING

Wear the safety goggles when using pressurized air.

1. When cleaning the filter element, remove the cover ① at the side of the spare seat, slightly lift the filter hook ② and pull out it to the direction of the arrow, then remove the inside air elemet ③.

2. Stop the air conditioner before cleaning the element.



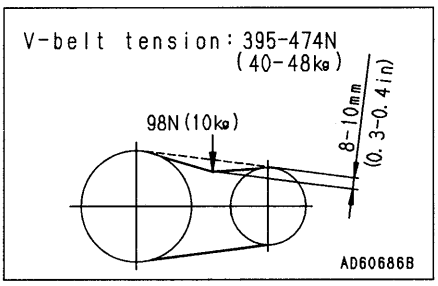


23.6.17 CHECKING AIR CONDITIONER COMPRESSOR BELT

Check for looseness, damage and wear of the air conditioner compressor belt.

1. Run the air conditioner for 10 minutes, add weight of 98N (10 kg) at the intermediate of the compressor and drive motor, and adjust the belt so that the bending is 8 – 10 mm (0.3 – 0.4 in).

2. Check for damage and wear of the belt, and if there is any anbnormalty, replace it to new one.



23.7 EVERY 500 HOURS SERVICE

Maintenance for every 50, 100 and 250 hours service should be carried out at the same time.

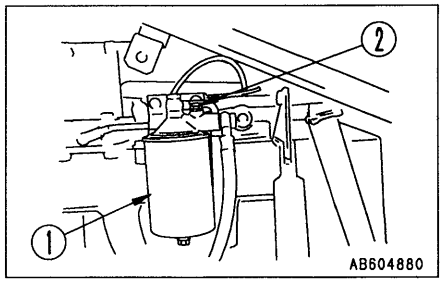
23.7.1 REPLACE FUEL FILTER CARTRIDGE

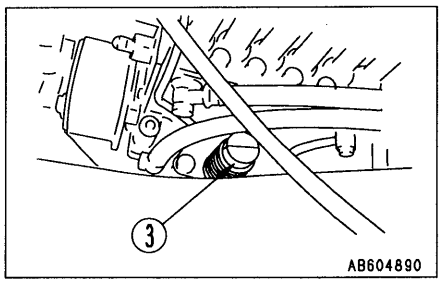
⚠ WARNING

- **The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before replacing the filter.**
- **Do not bring fire or sparks near the fuel.**

Prepare a filter wrench and a container to catch the fuel.

1. Set the container to catch the fuel under the filter cartridge.
2. Using a filter wrench, turn filter cartridge ① to the left to remove it.
3. Clean the filter holder, coat the packing surface of the new filter cartridge with engine oil, then install the cartridge.
4. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten a further 1/2 to 3/4 of a turn.
   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the clearance at the packing, so always tighten to the correct angle.
5. After replacing filter cartridge ①, loosen air bleed plug ②.
6. Loosen the knob of feed pump ③, and pump it up and down until no more bubbles come out with the fuel from air bleed plug ②.
7. Tighten air bleed plug ②.





8. After replacing the filter cartridge, start the engine and check for leakage of fuel from the filter seal surface.
   If there is any leakage, check that the filter cartridge is tightened correctly. If fuel still leaks, repeat Steps 1 and 2 to remove the filter cartridge, then check the packing surface for damage or foreign material.
   If any damage or foreign material is found in the packing, replace the packing with a new part, and repeat Steps 3 to 8 to install the filter cartridge.

If the engine misfires or black smoke comes out when starting the engine after it has run out of fuel, bleed the air from the fuel line as follows.

9. Loosen the connection at the outlet port of the fuel injection pump, and operate the feed pump to bleed the air in the same way as when installing the fuel filter.

10. After bleeding the air, tighten the connection of the fuel outlet port, push in the knob of the feed pump, then tighten it to hold it in position.

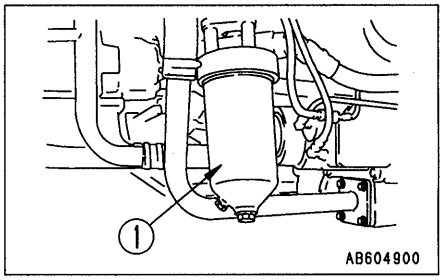
23.7.2 REPLACE TRANSMISSION OIL FILTER CARTRIDGE

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before replacing the filter.

Prepare a filter wrench.

1. Using the filter wrench provided with the machine, remove cartridge ①.

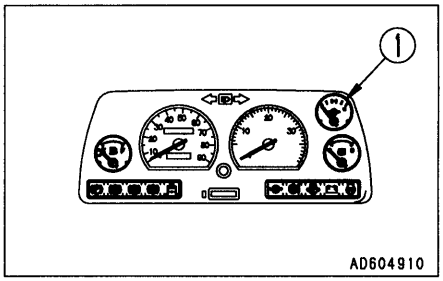


2. Coat the packing surface of the new cartridge with engine oil and install it to the filter holder.

3. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten a further 1/2 to 3/4 of a turn.

23.7.3 CHECK AIR GOVERNOR

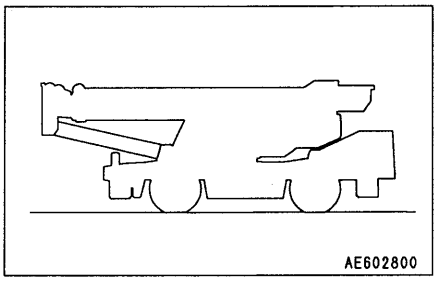
1. Open the valve of the air tank, release the air to make the air pressure 0 MPa (0 kgf/cm^2), then tighten the valve.



2. Start the engine, and check that the governor is cut and that compressed air is released when air pressure gauge ① reaches approx. 0.85 – 0.91 MPa (8.5 – 9.1 kgf/cm^2).

3. With the engine still running, depress the brake pedal repeatedly and check that the governor is engaged and the air pressure inside the tank starts to rise when air pressure gauge ① is approx. 0.73 – 0.76 MPa (7.3 – 7.6 kgf/cm^2).

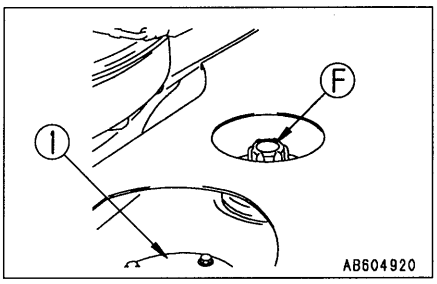
23.7.4 REPLACE HYDRAULIC FILTER ELEMENT

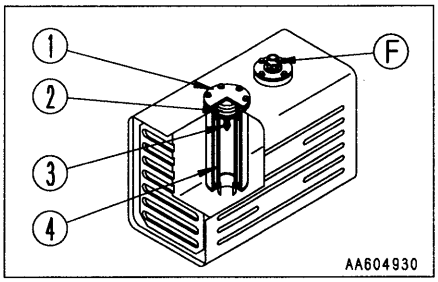


⚠ WARNING

- **The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before replacing the element.**
- **When the cover is removed, it may fly off under the force of the spring, so loosen the bolts gradually.**

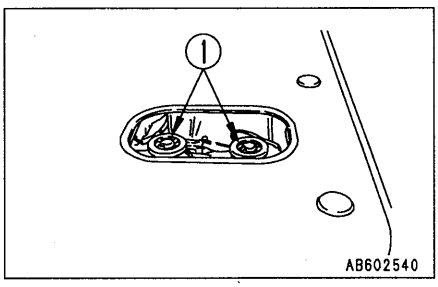
1. Set the machine to the travel posture.
2. Open filler port Ⓕ and leave it for several minutes to fully release the pressurization inside the tank.
3. Remove cover ①, then remove spring ② and valve ③, and take out element ④.
4. Clean the inside of the case and the parts that have been removed, then install a new element.



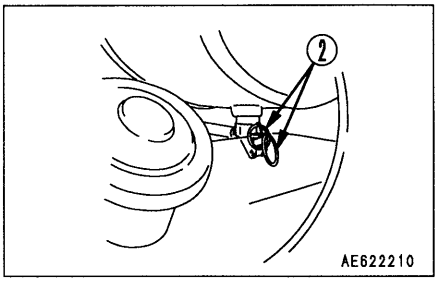


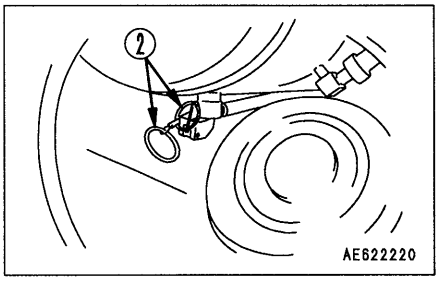
23.7.5 CHECK BRAKE ALARM SYSTEM

1. Set the starting switch to the ON position, then lift up cap ① (2 places) of the brake fluid tank and check that the brake fluid monitor lights up.



- Set the parking brake switch to the PARKING position, then carry out the following checks.
2. After checking that the air pressure gauge is in the specified range, stop the engine, then open drain valve ② (each 2 places) at the bottom of the wet air tank to reduce the air pressure, and check that the buzzer sounds.
3. Close drain valve ②, start the engine, and when the air pressure gauge enters the specified range, stop the engine.
4. Open drain valve ② at the bottom of the air dry tank and check that the buzzer sounds.





23.8 EVERY 1000 HOURS SERVICE

Maintenance for every 50, 100, 250 and 500 hours service should be carried out at the same time.

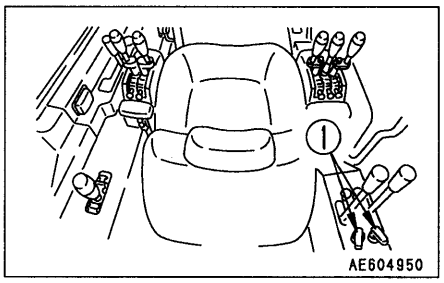
23.8.1 CHECK FUNCTION OF WINCH DRUM

1. Set winch drum lock lever ① to the LOCK position, then operate the winch lever and check the following.

- WIND IN: Possible
- WIND OUT: Locked

2. Set winch drum lock lever ① to the FREE position, then operate the winch lever and check the following.

- WIND IN: Possible
- WIND OUT: Possible



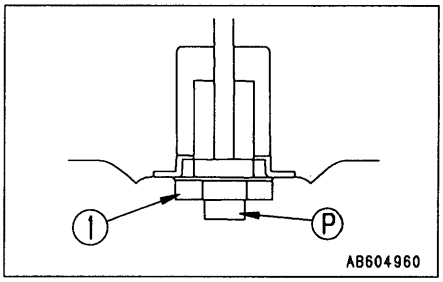
Carry out the above check for both the main winch and auxiliary winch.

23.8.2 CLEAN FUEL TANK STRAINER

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

1. Set a container to catch the fuel under drain plug Ⓟ at the bottom of the fuel tank.
2. Remove drain plug Ⓟ, drain the fuel, then tighten drain plug Ⓟ.
3. Remove strainer ① and clean it.
4. After installing the strainer, add fuel through the fuel filler port.



For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

23.8.3 CHANGE TRAVEL BRAKE FLUID

Contact your Komatsu distributor to have the travel brake fluid changed.

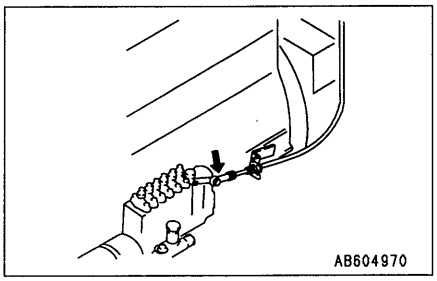
23.8.4 CHECK PLAY OF TURBOCHARGER ROTOR

Contact your Komatsu distributor for inspection.

23.8.5 CHECK TIGHTENING PORTIONS OF TURBOCHARGER

Contact your Komatsu distributor for inspection.

23.8.6 GREASE ENGINE STOP MOTOR LINKAGE (1 PLACE)



1. Apply grease to grease fitting at the arrow using grease pump.
2. Wipe off the old grease pushed out after greasing.

23.8.7 REPLACE CORROSION RESISTOR CARTRIDGE

⚠ WARNING

If the engine has been operated, all parts will be at a high temperature, so never try to replace the cartridge immediately after stopping the engine.
Always wait for the engine and other parts to cool down.

Prepare the followings
- Container to catch drained coolant
- Filter wrench

1. Move the levers (2 places) on the top of the corrosion resistor horizontally to close it.
2. Set a container to catch the coolant under the cartridge.
3. Using filter wrench, remove cartridge.
4. Clean the filter holder, coat the packing surface and thread of the new cartridge with engine oil, then install it to the filter holder.
5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 2/3 of a turn. If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of coolant. If the filter cartridge is too loose, coolant will also leak from the packing, so always tighten to the correct amount.
6. Move the levers (2 places) vertically to open it.
7. After replacing the cartridge, start the engine and check for any leakage of water from the filter seal surface. If there is any water leakage, check if the cartridge is tightened properly.

23.9 EVERY 2000 HOURS SERVICE

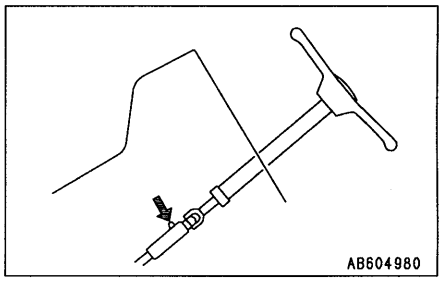
Maintenance for every 50, 100, 250, 500 and 1000 hours service should be carried out at the same time.

23.9.1 GREASE SATEERING COLUMN SHAFT (1 PLACE)

1. Apply grease to grease fitting at the arrow using grease pump.

2. Wipe off the old grease pushed out after greasing.

For datails of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBLICANTS ACCORDING TO AMBIENT TEMPERATURE".



23.9.2 CHANGE OIL IN WINCH REDUCTION GEAR CASE

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

Prepare the following.
- Container to catch drained oil: Min. 7 ℓ capacity
- Refill capacity: 7 ℓ (1.85 US gal, 1.54 UK gal) (both for main and auxiliary winch)

1. Hoist the boom to maximum length.
   With avoiding incorrect winding, lower the hook and ground it. Pull out wire rope until the drain plug ④ of drum ⑤ can be removed. Place the drain plug ④ just below.

2. Remove oil filler plug ①.

3. Set a container to catch the oil under drain plugs ③ and ④.

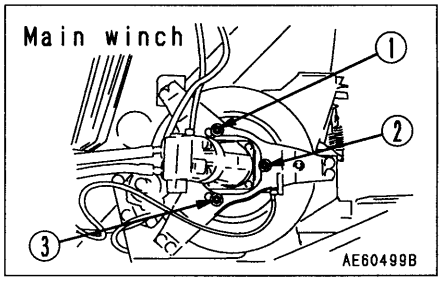
4. Remove drain plug ③ and ④, drain the oil, then tighten drain plugs ③ and ④ again.

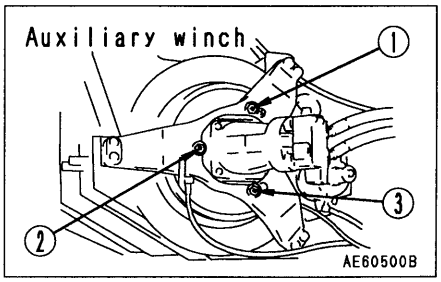
5. Add gear oil through level plug hole ① until the oil overflows.

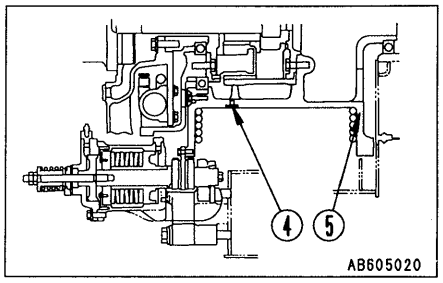
6. Remove level hook ② and check that the oil is added up to the bottom edge of the plug hole.

For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

7. Tighten oil filler plug ① and level plug ②.





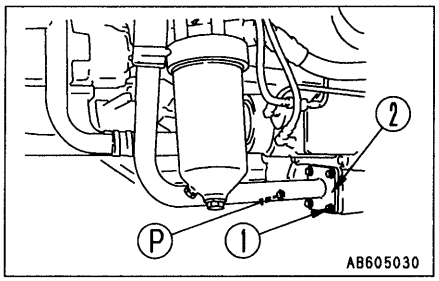


23.9.3 CHANGE OIL IN TRANSMISSION CASE, CASE, CLEAN STRAINER

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

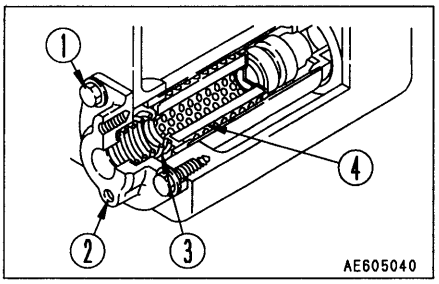
Prepare the following.
- Container to catch drained oil: Min. 25 ℓ capacity
- Refill capacity: 25 ℓ (6.60 US gal, 5.50 UK gal)



1. Set a container to catch the oil under drain plug Ⓟ.

2. Remove drain plug Ⓟ, drain the oil, then tighten drain plug Ⓟ again.

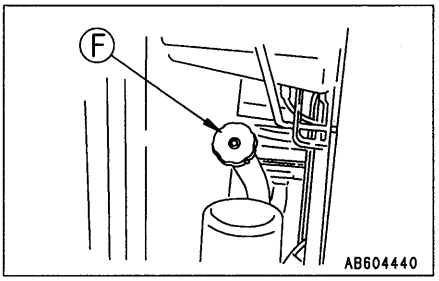
3. Remove bolt ①, then remove cover ② and take out spring ③.



4. Hook your finger inside strainer ④, and pull it out to remove it. If the strainer is damaged, replace it with a new part.

5. Use clean diesel fuel or flushing oil to remove the dirt stuck to the strainer. Wash the inside of the case and the removed parts at the same time.

6. Install the strainer.



7. After installing the strainer, replace the transmission oil filter cartridge.
   For details, see "23.7 EVERY 500 HOURS SERVICE".

8. Add engine oil through oil filler port Ⓕ to the specified level.

   For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

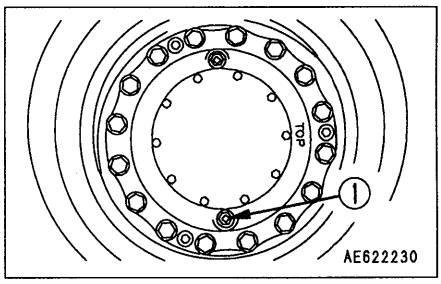
9. After filling with oil, check that the oil is at the specified level.
   For details, see "23.4 EVERY 50 HOURS SERVICE".

23.9.4 CHANGE OIL IN FINAL DRIVE GEAR CASE

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

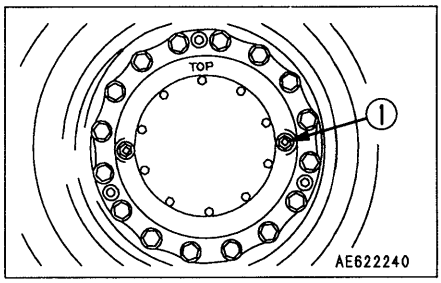
Prepare the following.
- Container to catch drained oil: Min. 28 ℓ capacity
- Refill capacity (each): 7 ℓ (1.85 US gal, 1.54 UK gal)
- Socket wrench



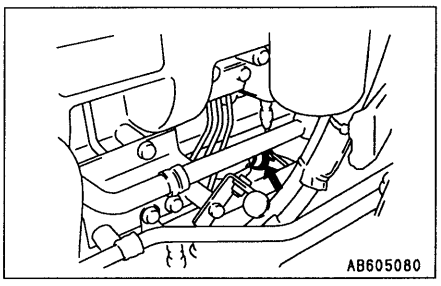
1. Stop the machine so that plug ① is directly at the bottom.
2. Set the container to catch the oil under plug ①.
3. Remove plug ①, drain the oil, then tighten plug ① again.
4. Move the machine so that the TOP casting mark on the final drive case cover is at the top.
5. Add gear oil through plug hole ① to the specified level.

   For details of the oil to use, see "19. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".
6. After filling with oil, check that the oil is at the specified level.

   For details, see "23.2 WHEN REQUIRED".



23.9.5 CLEAN ENGINE BREATHER ELEMENT



1. Loosen the clamp, then remove the hose and take out the breather.
2. Wash the whole breather in diesel fuel or flushing oil, blow it dry with compressed air, then install it.
3. Inspect the hoses, and if there is any deteriorated oil (sludge) stuck inside the hose, replace it with a new part.

   Wipe off the dirt around the breather before removing it.
   Check the O-ring, and replace it with a new part if necessary. Coat with engine oil when installing.

23.9.6 CHANGE OIL IN HYDRAULIC TANK

⚠ WARNING

The oil is at high temperature after the machine has been operated. Always wait for the temperature to go down before changing the oil.
When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

Prepare the following
- Container to catch drained oil: Min. 420 ℓ capacity
- Refill capacity: 420 ℓ (111 US gal, 92 UK gal)

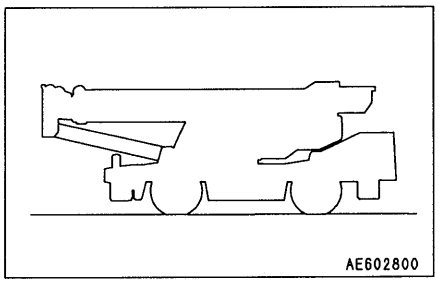
1. Set the machine to the travel posture, then set the parking brake switch to the ON position.

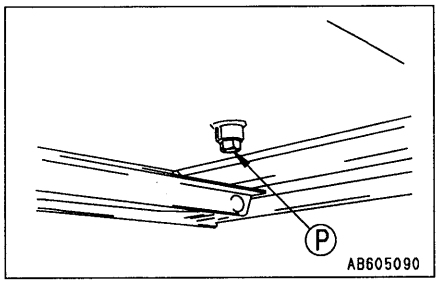
2. Set a container to catch the oil under drain plug Ⓟ at the bottom of the tank.
   Remove drain plug Ⓟ, drain the oil, then tighten drain plug Ⓟ again.

3. Remove drain plug Ⓟ, drain the oil, then tighten drain plug Ⓟ again.

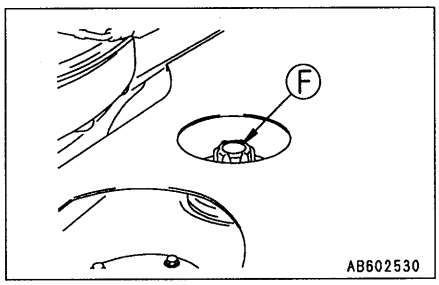
4. Replace the filter element.
   For details, see "23.7 EVERY 500 HOURS SERVICE".

5. Add hydlauric oil through oil filler port Ⓕ to the specified level.


AE602800



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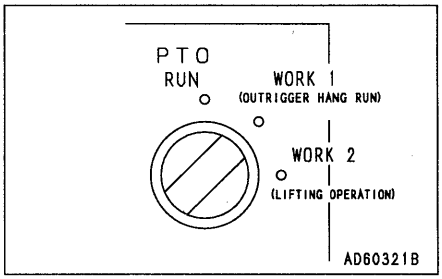
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When checking and refilling the hydraulic oil, please contact your Komatsu distributor.

The recomended oil for HO46-HM

Supplier	Oil
Esso	Uni-power SQ46K
Mobil	Mobil DTE25
Shell	Hydroconto oil K

6. Set the PTO switch to the "WORK 1" position, run the engine at low idling for approx. 2 to 3 minutes, then check that the oil is at the specified level.
   For details, see "23.3 CHECK BEFORE STARTING".



23.9.7 CHANGE OIL IN DIFFERENTIAL GEAR CASE

⚠ WARNING

The engine is at high temperature after the machine has been operated. Always wait for the temperature to go down before starting this operation.

Prepare the following
- Container to catch drained oil: Min. 50 ℓ capacity
- Refill capacity: 25 ℓ (6.6 US gal, 5.5 UK gal)

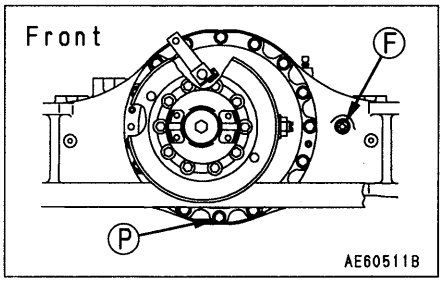
1. Set a container to catch the oil under drain plug Ⓟ.

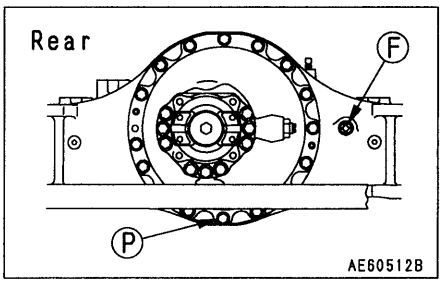
2. Remove drain plug Ⓟ, drain the oil, then tighten drain plug Ⓟ again.

3. Add gear oil through oil filler port Ⓕ to the specified level.

   For details, see "19. USE OF FUEL, COOLANT AND LUBLICANTS ACCORDING TO AMBIENT TEMPERATURE".

4. After filling with oil, check that oil is at the specified level after adding oil. See "23.2 WHEN REQUIRED".





23.9.8 CLEAN TURBOCHAGER, CHECK

Contact your Komatsu distributer for cleaning and inspection.

23.9.9 CHECK ALTERNATOR, STARTING MOTOR

The brush may be worn and the bearing may have run out of grease, so contact your Komatsu distributor for inspection and repair.

In case where the engine is started frequently, carry out this insoection every 1000 hours.

23.9.10 CHECK ENGINE VALVE CLEARANCE, ADJUST

Contact your Komatsu distributor for inspection and maitenance.

23.9.11 CHECK VIBRATION DAMPER

Check the outside surface of the rubber for cracks and peeling. If any cracks or peeling are found, contact your Komatsu distributor for ireplacement.

23.9.12 REPLACE AIR DRYER DESICCANT (FOR MACHINES EQUIPPED WITH AIR DRYER)

Contact your Komatsu distributor for replacement.

23.10 EVERY 4000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

23.10.1 CHECK WATER PUMP

Check for play in the pully, leakage of oil or water, and clogging of the drain hole. If any abnormality is found, contact your Komatsu distributor for disassembly and repair or replacement.

23.10.2 CHECK AIR COMPRESSOR, ADJUST

Contact your Komatsu distributor for inspection and adjustment.

SPECIFICATIONS

24. SPECIFICATIONS

WING250 (LW250-5)
[Machines equipped with H-shaped outrigger]

PERFORMANCE

	Boom length	Capacity	Conditions
• Crane capacity	7.6 m (24 ft 11 in)	26.0 t x 3.0 m (9 ft 11 in)	Outrigger fully extended, 360° operations
	13.7 m (44 ft 11 in)	21.0 t x 3.5 m (11 ft 6 in)	
	19.8 m (64 ft 11 in)	14.5 t x 4.5 m (14 ft 9 in)	
	25.9 m (84 ft 11 in)	10.6 t x 5.5 m (18 ft)	
	30.5 m (100 ft)	7.0 t x 8.0 m (26 ft 3 in)	
	32.0 m (104 ft 11 in)	5.9 t x 8.0 m (26 ft 3 in)	
	7.6 m (24 ft 11 in)	9.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, 360° operations
	7.6 m (24 ft 11 in)	14.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, over-front operations

• Main winch line speed(high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in)/min
• Auxiliary winch line speed (high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in)/min
• Time taken to raise boom (0° – 83°)		44 sec
• Time taken to extend boom (7.6 m – 32 m)		75 sec
• Travel speed	High range (2WD/4WD)	0 – 49 km/h (0 – 30 MPH)
	Low range (4WD)	0 – 21 km/h (0 – 13 MPH)
• Min. turning radius	2-wheel steering	9.3 m (30 ft 6 in)
	4-wheel steering	5.4 m (17 fc 8 in)

WEIGHT

• Operating weight (not including operator)	26,870 kg (59,250 lb)

BOOM

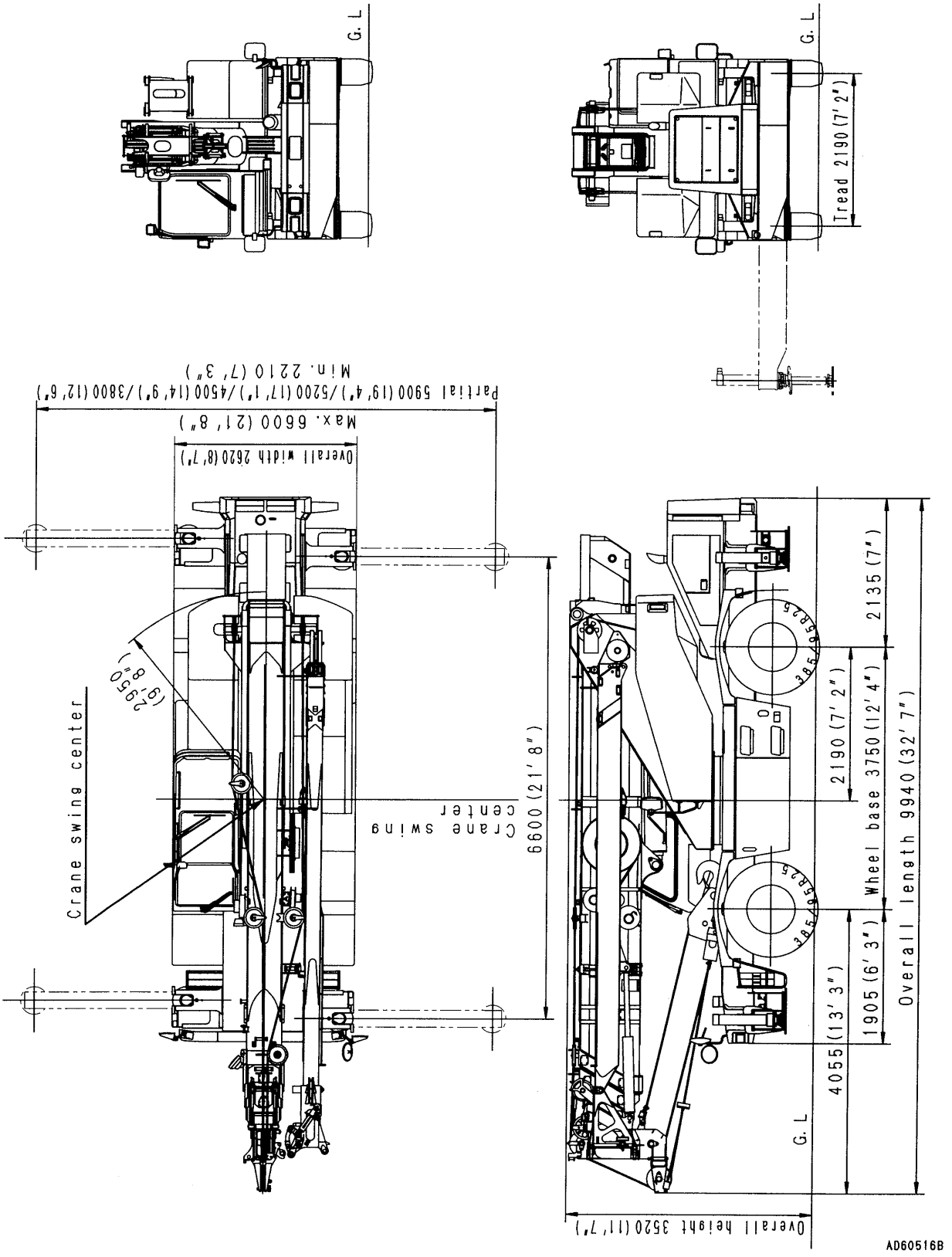
• Boom length		7.6 m – 32 m (24 ft 11 in – 104 ft 11 in)
• Wire rope dimensions	Main winch	Ø 16 mm x 176 m (Ø 0.63 in x 577 ft)
	Auxiliary winch	Ø 16 mm x 98 m (Ø 0.63 in x 321 ft 4 in)
• Type of rope		JIS No. 18 7x7+6xFi(29) B type, normal Z lay

ENGINE

• Type	Komatsu S6D125E-2 diesel engine
• Rated horsepower	184 kW (247 HP) / 2,100 rpm
• Max. torque	1,030 N•m (105 kgf•m) / 1,400 rpm
• Starting motor	24 V 7.5 kW
• Alternator	24 V 50 A
• Battery	12 V 120 Ah x 2 pieces

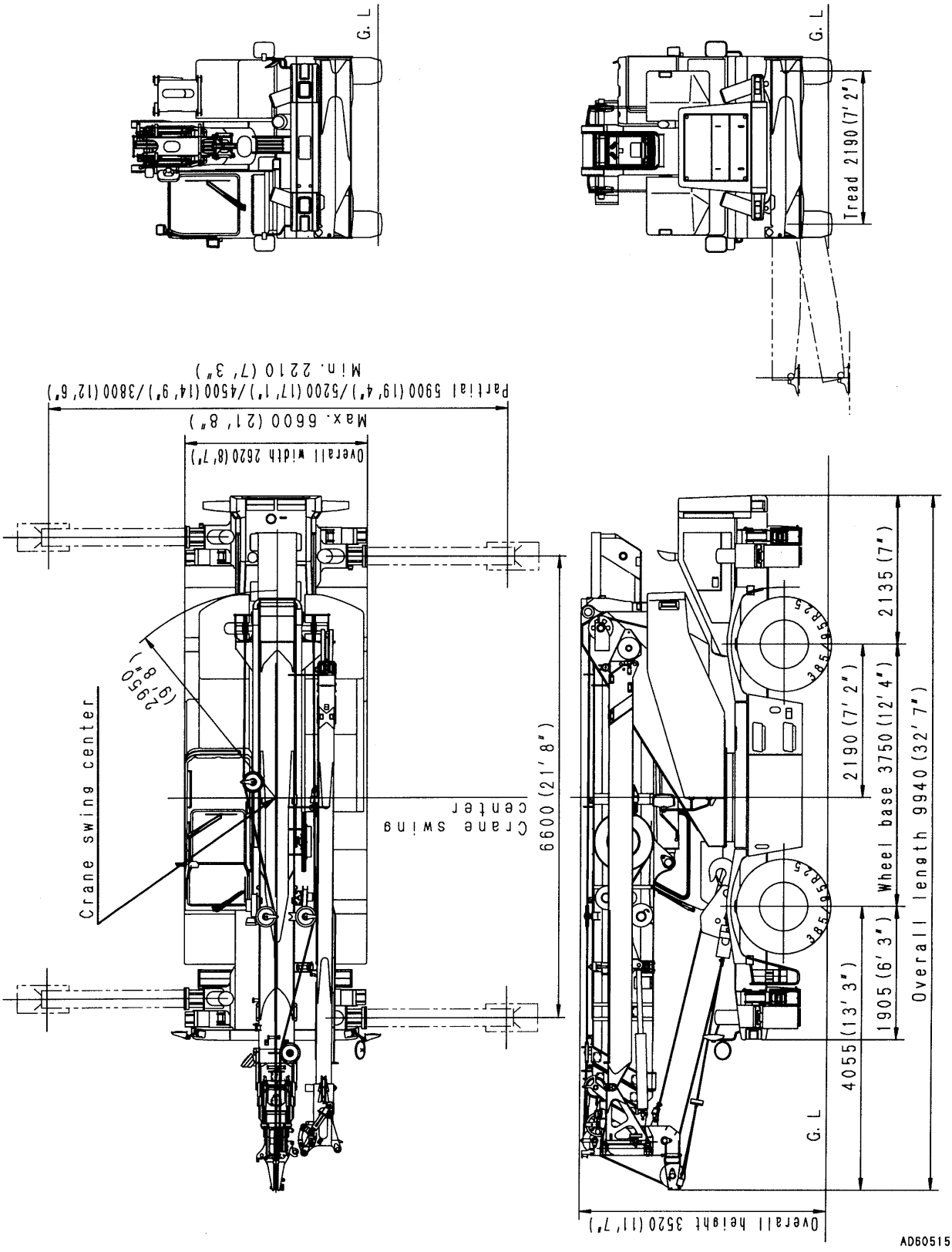
TIRE

• Size	Front wheel	385/95R25
	Rear wheel	385/95R25


G. L
Tread 2190 (7' 2")
Min. 2210 (7' 3")
Partial 5900 (19' 4")/5200 (17' 1")/4500 (14' 9")/3800 (12' 6")
Max. 6600 (21' 8")
Overall width 2620 (8' 7")
2,950 (9' 8")
Crane swing center
6600 (21' 8")
Crane swing center
2135 (7")
2190 (7' 2")
Wheel base 3750 (12' 4")
1905 (6' 3")
4055 (13' 3")
Overall length 9940 (32' 7")
G. L
Overall height 3520 (11' 7")
AD60516B

WING250 (LW250-5)
[Machines equipped with X-shaped outrigger]

PERFORMANCE			
• Crane capacity	Boom length	Capacity	Conditions
	7.6 m (24 ft 11 in)	26.0 t x 3.0 m (9 ft 10 in)	Outrigger fully extended, 360° operations
	13.7 m (44 ft 11 in)	21.0 t x 3.5 m (11 ft 6 in)	
	19.8 m (64 ft 11 in)	14.5 t x 4.5 m (14 ft 9 in)	
	25.9 m (84 ft 11 in)	10.6 t x 5.5 m (18 ft)	
	30.5 m (100 ft)	7.0 t x 8.0 m (26 ft 3 in)	
	32.0 m (104 ft 11 in)	5.9 t x 8.0 m (26 ft 3 in)	
	7.6 m (24 ft 11 in)	9.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, 360° operations
	7.6 m (24 ft 11 in)	14.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, over-front operations
• Main winch line speed(high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in) / min	
• Auxiliary winch line speed (high-low) 4 levels		130 – 65 m (426 ft 3 in – 230 ft 1 in) / min	
• Time taken to raise boom (0° – 83°)		44 sec	
• Time taken to extend boom (7.6 m – 32 m)		75 sec	
• Travel speed	High range (2WD/4WD)	0 – 49 km/h (0 – 30 MPH)	
	Low range (4WD)	0 – 21 km/h (0 – 13 MPH)	
• Min. turning radius	2-wheel steering	9.3 m (30 ft 6 in)	
	4-wheel steering	5.4 m (17 ft 8 in)	
WEIGHT			
• Operating weight (not including operator)		26,870 kg (59,250 lb)	
BOOM			
• Boom length		7.6 m – 32 m (24 ft 11 in – 104 ft 11 in)	
• Wire rope dimensions	Main winch	Ø 16 mm x 176 m (Ø 0.63 in x 577 ft)	
	Auxiliary winch	Ø 16 mm x 98 m (Ø 0.63 in x 321 ft 4 in)	
• Type of rope		JIS No. 18 7x7+6xFi(29) B type, normal Z lay	
ENGINE			
• Type		Komatsu S6D125E-2 diesel engine	
• Rated horsepower		184 kW (247 HP) / 2,100 rpm	
• Max. torque		1,030 N•m (105 kgf•m) / 1,400 rpm	
• Starting motor		24 V 7.5 kW	
• Alternator		24 V 50 A	
• Battery		12 V 120 Ah x 2 pieces	
TIRE			
• Size	Front wheel	385/95R25	
	Rear wheel	385/95R25	


G. L
Tread 2190 (7' 2")
Min. 2210 (7', 3")
Partial 5900 (19', 4")/5200 (17', 1")/4500 (14', 9")/3800 (12', 6")
Max. 6600 (21', 8")
Overall width 2620 (8', 7")
2950 (9'-8")
Crane swing center
6600 (21' 8")
2135 (7")
2190 (7' 2")
Wheel base 3750 (12' 4")
1905 (6' 3")
4055 (13' 3")
Overall length 9940 (32' 7")
Overall height 3520 (11', 7")
AD60515B

RATED OVERALL LOAD TABLE

- Boom operations with outriggers set

(Unit:ton)

Outriggers fully extended 6.6m (360) X, H type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		14.20	12.30	9.80	7.00	5.90
7.0		13.00	11.60	9.25	7.00	5.90
8.0		10.00	10.00	8.25	7.00	5.90
9.0		7.90	8.70	7.45	6.30	5.50
10.0		6.45	7.20	6.75	5.80	5.10
11.0		5.30	6.10	6.05	5.30	4.70
12.0			5.20	5.50	4.90	4.35
13.0			4.45	4.70	4.50	4.00
14.0			3.80	4.10	4.15	3.65
15.0			3.20	3.70	3.80	3.35
16.0			2.85	3.25	3.45	3.10
17.0			2.50	2.90	3.05	2.90
18.0				2.55	2.70	2.70
19.0				2.25	2.45	2.50
20.0				2.00	2.20	2.25
22.0				1.55	1.75	1.80
24.0					1.40	1.45
26.0					1.15	1.15
28.0						0.95
29.0						0.75
Danger angle	---	---	---	---	---	---

(Unit:ton)

Outriggers partially extended 5.9m (Over-side) X, H type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	18.10	17.60	14.40	10.60	7.00	5.90
5.5		16.50	13.80	10.60	7.00	5.90
6.0		15.30	13.00	10.40	7.00	5.90
6.5		13.10	12.30	9.80	7.00	5.90
7.0		11.20	11.60	9.25	7.00	5.90
8.0		8.45	9.35	8.25	7.00	5.90
9.0		6.65	7.45	7.45	6.30	5.50
10.0		5.35	6.10	6.50	5.80	5.10
11.0		4.40	5.10	5.50	5.30	4.70
12.0			4.30	4.70	4.85	4.35
13.0			3.70	4.05	4.20	4.00
14.0			3.20	3.50	3.70	3.65
15.0			2.75	3.10	3.25	3.30
16.0			2.40	2.70	2.85	2.90
17.0			2.10	2.40	2.55	2.60
18.0				2.10	2.25	2.30
19.0				1.85	2.00	2.05
20.0				1.65	1.80	1.85
22.0				1.20	1.40	1.45
24.0					1.00	1.10
26.0					0.75	0.75
28.0						0.55
29.0						
Danger angle	---	---	---	---	---	10°

AD60517B

(Unit:ton)

Outriggers partially extended 5.2m (Over-side) X, H type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	23.40	20.00	14.50	10.60	7.00	5.90
4.5	21.40	18.90	14.50	10.60	7.00	5.90
5.0	17.75	17.60	14.40	10.60	7.00	5.90
5.5		15.05	13.50	10.60	7.00	5.90
6.0		12.50	12.70	10.40	7.00	5.90
6.5		10.50	11.05	9.80	7.00	5.90
7.0		9.05	10.00	9.25	7.00	5.90
8.0		6.90	7.75	7.80	7.00	5.90
9.0		5.40	6.20	6.50	6.30	5.50
10.0		4.30	5.10	5.50	5.65	5.10
11.0		3.55	4.25	4.60	4.80	4.70
12.0			3.60	3.95	4.15	4.15
13.0			3.05	3.35	3.55	3.60
14.0			2.60	2.90	3.10	3.15
15.0			2.20	2.55	2.70	2.75
16.0			1.85	2.20	2.40	2.45
17.0			1.55	1.95	2.10	2.15
18.0				1.70	1.80	1.85
19.0				1.45	1.60	1.65
20.0				1.20	1.40	1.45
22.0				0.80	1.00	1.05
24.0					0.70	0.75
26.0						0.50
28.0						
29.0						
Danger angle	---	---	---	---	18°	24°

(Unit:ton)

Outriggers partially extended 4.5m (Over-side) X, H type						
Boom length (m) / Working radius (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	25.40	21.00	14.50	10.60	7.00	
4.0	22.50	20.00	14.50	10.60	7.00	5.90
4.5	18.50	17.74	14.50	10.60	7.00	5.90
5.0	14.50	14.05	14.40	10.60	7.00	5.90
5.5		11.50	12.50	10.60	7.00	5.90
6.0		9.60	10.55	10.40	7.00	5.90
6.5		8.20	9.05	9.55	7.00	5.90
7.0		7.05	7.90	8.36	7.00	5.90
8.0		5.40	6.15	6.60	6.75	5.90
9.0		4.20	4.95	5.35	5.50	5.50
10.0		3.35	4.05	4.40	4.60	4.65
11.0		2.65	3.35	3.70	3.85	3.90
12.0			2.80	3.15	3.30	3.35
13.0			2.35	2.70	2.85	2.90
14.0			1.95	2.30	2.45	2.50
15.0			1.60	1.95	2.15	2.15
16.0			1.30	1.70	1.85	1.90
17.0			1.00	1.40	1.55	1.60
18.0				1.10	1.30	1.40
19.0				0.90	1.05	1.15
20.0				0.70	0.85	0.95
22.0					0.55	0.65
Danger angle	---	---	---	18°	34°	36°

AD60518B

(Unit : ton)

Outriggers partially extended 3.8m (Over-side) X, H type						
Working radius (m) \ Boom length (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	26.00	21.00	14.50			
3.0	26.00	21.00	14.50	10.60		
3.5	22.50	20.00	14.50	10.60	7.00	
4.0	17.50	16.65	14.50	10.60	7.00	5.90
4.5	13.70	12.95	13.50	10.60	7.00	5.90
5.0	10.90	10.45	11.10	10.60	7.00	5.90
5.5		8.65	9.40	9.65	7.00	5.90
6.0		7.30	8.05	8.30	7.00	5.90
6.5		6.20	7.00	7.20	7.00	5.90
7.0		5.35	6.10	6.45	6.60	5.90
8.0		4.05	4.80	5.10	5.30	5.40
9.0		3.15	3.85	4.15	4.35	4.40
10.0		2.45	3.10	3.40	3.60	3.65
11.0		1.80	2.50	2.85	3.00	3.05
12.0			2.05	2.40	2.55	2.60
13.0			1.60	2.00	2.15	2.20
14.0			1.30	1.70	1.80	1.85
15.0			1.00	1.40	1.50	1.55
16.0			0.70	1.10	1.25	1.30
17.0				0.85	1.05	1.10
18.0				0.65	0.85	0.90
19.0					0.65	0.70
20.0						0.55
22.0						
Danger angle	---	---	---	35°	42°	45°

(Unit : ton)

Minimum extension of outriggers 2.21m (Over-side) (H type only)						
Working radius (m) \ Boom length (m)	7.6	13.7	19.8	25.9	30.5	32.0
2.5	13.00	12.00	11.00			
3.0	12.50	11.70	11.00	8.30		
3.5	9.55	9.10	9.50	8.30	5.50	
4.0	7.70	7.10	7.50	7.30	5.50	4.30
4.5	6.25	5.65	6.10	6.30	5.50	4.30
5.0	5.00	4.60	5.10	5.45	5.50	4.30
5.5		3.80	4.30	4.65	4.75	4.30
6.0		3.15	3.70	4.00	4.15	4.30
6.5		2.60	3.10	3.50	3.65	3.70
7.0		2.15	2.70	3.00	3.20	3.25
8.0		1.30	2.00	2.30	2.50	2.55
9.0		0.70	1.40	1.80	1.95	2.00
10.0			1.00	1.45	1.55	1.60
11.0			0.60	1.05	1.20	1.25
12.0				0.70	0.90	0.95
13.0						
14.0						
15.0						
16.0						
17.0						
18.0						
19.0						
20.0						
22.0						
Danger angle	---	35°	50°	58°	60°	61°

AD60519B

- Boom operations with outriggers not used (stationary hoist)

(Unit:ton)

Boom length (m) / Working radius (m)	Over-front			
	7.6	13.7	19.8	25.9
3.0	14.00	11.00	7.80	
3.5	12.00	10.20	7.80	5.70
4.0	10.75	9.70	7.80	5.70
4.5	9.65	9.30	7.80	5.70
5.0	8.70	8.20	7.40	5.70
5.5		6.90	6.80	5.70
6.0		5.90	6.20	5.70
6.5		5.10	5.60	5.30
7.0		4.40	5.00	4.95
8.0		3.40	4.00	4.15
9.0		2.55	3.20	3.40
10.0		2.00	2.60	2.85
11.0		1.50	2.15	2.35
12.0			1.80	2.00
13.0			1.40	1.70
14.0			1.05	1.45
15.0			0.75	1.15
16.0			0.50	0.90
17.0				0.65
18.0				0.45
Danger angle	---	---	20°	39°

(Unit:ton)

Boom length (m) / Working radius (m)	360			
	7.6	13.7	19.8	25.9
3.0	9.00	8.00	6.00	
3.5	7.40	6.80	6.00	3.50
4.0	6.10	5.40	5.85	3.50
4.5	5.05	4.40	4.75	3.50
5.0	4.00	3.60	4.10	3.50
5.5		3.00	3.50	3.50
6.0		2.50	3.00	3.20
6.5		2.10	2.55	2.75
7.0		1.75	2.15	2.40
8.0		1.00	1.60	1.80
9.0			1.15	1.40
10.0			0.75	1.05
11.0				0.75
12.0				
13.0				
14.0				
15.0				
16.0				
17.0				
18.0				
Danger angle	---	36°	52°	60°

AB60520B

- Boom operations with outriggers not used (machine traveling with hoisting at max speed 1.6 km/h (1 MPH))

(Unit : ton)

Boom length (m) / Working radius (m)	Over-front			
	7.6	13.7	19.8	25.9
3.0	10.00	8.70	6.60	
3.5	9.00	8.20	6.60	5.00
4.0	8.00	7.50	6.60	5.00
4.5	7.10	6.80	6.60	5.00
5.0	6.40	6.15	6.30	5.00
5.5		5.50	5.70	5.00
6.0		4.80	5.15	4.80
6.5		4.10	4.65	4.50
7.0		3.60	4.10	4.25
8.0		2.75	3.30	3.45
9.0		2.15	2.60	2.85
10.0		1.70	2.15	2.35
11.0		1.30	1.80	2.00
12.0			1.50	1.70
13.0			1.25	1.45
14.0			0.95	1.20
15.0			0.65	1.00
16.0				0.75
17.0				0.55
Danger angle	---	---	28°	41°

(Unit : ton)

Boom length (m) / Working radius (m)	360			
	7.6	13.7	19.8	25.9
3.0	6.80	5.80	4.20	
3.5	5.55	5.00	4.20	2.55
4.0	4.65	4.20	4.20	2.55
4.5	3.95	3.50	3.95	2.55
5.0	3.35	3.00	3.30	2.55
5.5		2.50	2.90	2.55
6.0		2.10	2.50	2.55
6.5		1.75	2.10	2.30
7.0		1.45	1.80	2.00
8.0		0.80	1.30	1.50
9.0			0.90	1.10
10.0			0.50	0.80
11.0				0.60
12.0				
13.0				
14.0				
15.0				
16.0				
17.0				
Danger angle	---	42°	53°	61°

AD60521B

- Power tilt jib operations with outriggers set (30.5 m (100 ft) boom + auxiliary jib operation)

(Unit:ton)

Outriggers fully extended 6.6m (360) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	3.00	2.50	2.10	1.60	1.00	83.0	2.00	1.60	1.15	0.80	0.50
80.0	3.00	2.50	2.10	1.60	1.00	80.0	2.00	1.60	1.15	0.80	0.50
75.0	3.00	2.50	2.10	1.60	1.00	75.0	2.00	1.60	1.15	0.80	0.50
72.0	3.00	2.50	2.10	1.60	1.00	72.0	1.80	1.50	1.12	0.80	0.50
70.0	3.00	2.50	2.10	1.60	1.00	70.0	1.70	1.43	1.07	0.80	0.50
65.0	2.60	2.25	1.97	1.56	0.93	65.0	1.45	1.25	0.97	0.79	0.48
60.0	2.15	2.00	1.75	1.44	0.85	60.0	1.25	1.10	0.91	0.76	0.46
55.0	1.60	1.55	1.45	1.30		55.0	1.12	1.00	0.86	0.74	
50.0	1.15	1.13	1.05	1.02		50.0	0.87	0.82	0.78	0.72	
45.0	0.80	0.75	0.73	0.72		45.0	0.57	0.55	0.54	0.54	
40.0	0.50	0.50	0.48			40.0	0.40	0.38	0.37		
37.0	0.41	0.39	0.38								
35.0	0.35										
Danger angle	33°	35°	35°	43°	58°	Danger angle	38°	38°	38°	43°	58°

Outriggers partially extended 5.9m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	3.00	2.50	2.10	1.60	1.00	83.0	2.00	1.60	1.15	0.80	0.50
80.0	3.00	2.50	2.10	1.60	1.00	80.0	2.00	1.60	1.15	0.80	0.50
75.0	3.00	2.50	2.10	1.60	1.00	75.0	2.00	1.60	1.15	0.80	0.50
72.0	3.00	2.50	2.10	1.60	1.00	72.0	1.80	1.50	1.12	0.80	0.50
70.0	3.00	2.50	2.10	1.60	1.00	70.0	1.70	1.43	1.07	0.80	0.50
65.0	2.60	2.25	1.97	1.56	0.93	65.0	1.45	1.25	0.97	0.79	0.48
60.0	1.83	1.72	1.63	1.44	0.85	60.0	1.25	1.10	0.91	0.76	0.46
55.0	1.25	1.22	1.14	1.13		55.0	0.93	0.91	0.83	0.74	
50.0	0.81	0.79	0.76	0.75		50.0	0.58	0.57	0.55	0.53	
45.0	0.47	0.46	0.45	0.43		48.0	0.46	0.46	0.44	0.43	
Danger angle	43°	43°	43°	43°	58°	Danger angle	46°	46°	46°	46°	58°

Outriggers partially extended 5.2m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	3.00	2.50	2.10	1.60	1.00	83.0	2.00	1.60	1.15	0.80	0.50
80.0	3.00	2.50	2.10	1.60	1.00	80.0	2.00	1.60	1.15	0.80	0.50
75.0	3.00	2.50	2.10	1.60	1.00	75.0	2.00	1.60	1.15	0.80	0.50
72.0	3.00	2.50	2.10	1.60	1.00	72.0	1.80	1.50	1.12	0.80	0.50
70.0	3.00	2.50	2.10	1.60	1.00	70.0	1.70	1.43	1.07	0.80	0.50
65.0	2.15	2.00	1.85	1.56	0.93	65.0	1.45	1.25	0.97	0.79	0.48
60.0	1.40	1.35	1.21	1.21	0.85	60.0	1.00	0.97	0.87	0.75	0.46
55.0	0.85	0.82	0.75	0.75		55.0	0.61	0.60	0.53	0.51	
50.0	0.45	0.44	0.40	0.40		53.0	0.45	0.45	0.40	0.39	
Danger angle	48°	48°	48°	48°	58°	Danger angle	51°	51°	51°	51°	58°

AD62225B

- Power tilt jib operations with outriggers set (30.5 m (100 ft) boom + auxiliary jib operation)

(Unit : ton)

Outriggers partially extended 4.5m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	3.00	2.50	2.10	1.60	1.00	83.0	2.00	1.60	1.15	0.80	0.50
80.0	3.00	2.50	2.10	1.60	1.00	80.0	2.00	1.60	1.15	0.80	0.50
75.0	3.00	2.50	2.10	1.60	1.00	75.0	2.00	1.60	1.15	0.80	0.50
72.0	3.00	2.50	2.10	1.60	1.00	72.0	1.80	1.50	1.12	0.80	0.50
70.0	2.55	2.35	2.10	1.60	1.00	70.0	1.70	1.43	1.07	0.80	0.50
65.0	1.63	1.55	1.42	1.34	0.93	65.0	1.18	1.10	0.95	0.79	0.48
60.0	0.93	0.90	0.82	0.78	0.76	60.0	0.65	0.63	0.56	0.51	0.46
55.0	0.43	0.43	0.38	0.38							
Danger angle	53°	53°	53°	53°	58°	Danger angle	58°	58°	58°	58°	58°

Outriggers partially extended 3.8m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	3.00	2.50	2.10	1.60	1.00	83.0	2.00	1.60	1.15	0.80	0.50
80.0	3.00	2.50	2.10	1.60	1.00	80.0	2.00	1.60	1.15	0.80	0.50
75.0	3.00	2.50	2.10	1.60	1.00	75.0	2.00	1.60	1.15	0.80	0.50
72.0	2.45	2.23	1.92	1.60	1.00	72.0	1.80	1.50	1.12	0.80	0.50
70.0	1.95	1.83	1.66	1.52	1.00	70.0	1.50	1.35	1.05	0.80	0.50
65.0	1.05	1.03	0.94	0.86	0.80	65.0	0.75	0.72	0.61	0.56	0.45
60.0	0.45	0.45	0.40								
Danger angle	58°	58°	58°	63°	63°	Danger angle	63°	63°	63°	63°	63°

AD62226B

- Power tilt jib operations with outriggers set (32.0 m (104 ft 11 in) boom + auxiliary jib operation)

(Unit:ton)

Outriggers fully extended 6.6m (360) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	2.60	2.20	1.80	1.60	1.00	83.0	1.70	1.40	1.00	0.70	0.50
80.0	2.60	2.20	1.80	1.60	1.00	80.0	1.70	1.40	0.96	0.70	0.50
75.0	2.60	2.20	1.80	1.60	1.00	75.0	1.70	1.32	0.87	0.69	0.50
72.0	2.60	2.20	1.80	1.51	0.88	72.0	1.45	1.10	0.83	0.66	0.48
70.0	2.55	2.15	1.80	1.46	0.86	70.0	1.30	1.02	0.80	0.64	0.47
65.0	2.05	1.76	1.57	1.33	0.81	65.0	1.05	0.87	0.72	0.59	0.43
60.0	1.75	1.50	1.31	1.15	0.78	60.0	0.92	0.78	0.66	0.56	0.40
55.0	1.30	1.20	1.11	0.98		55.0	0.80	0.71	0.63	0.54	
50.0	0.97	0.92	0.88	0.81		50.0	0.64	0.58	0.53	0.51	
45.0	0.62	0.60	0.58	0.58		45.0	0.45	0.44	0.43	0.42	
40.0	0.37	0.37	0.37			42.5	0.38	0.38	0.37		
Danger angle	38°	38°	38°	43°	58°	Danger angle	41°	41°	41°	43°	58°

Outriggers partially extended 5.9m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	2.60	2.20	1.80	1.60	1.00	83.0	1.70	1.40	1.00	0.70	0.50
80.0	2.60	2.20	1.80	1.60	1.00	80.0	1.70	1.40	0.96	0.70	0.50
75.0	2.60	2.20	1.80	1.60	1.00	75.0	1.70	1.32	0.87	0.69	0.50
72.0	2.60	2.20	1.80	1.51	0.88	72.0	1.45	1.10	0.83	0.66	0.48
70.0	2.55	2.15	1.80	1.46	0.86	70.0	1.30	1.02	0.80	0.64	0.47
65.0	2.05	1.76	1.57	1.33	0.81	65.0	1.05	0.87	0.72	0.59	0.43
60.0	1.65	1.50	1.31	1.15	0.78	60.0	0.92	0.78	0.66	0.56	0.40
55.0	1.00	1.00	1.00	0.95		55.0	0.78	0.69	0.62	0.54	
50.0	0.60	0.60	0.60	0.60		50.0	0.46	0.44	0.43	0.40	
47.5	0.47	0.47	0.45	0.45							
Danger angle	46°	46°	46°	46°	58°	Danger angle	48°	48°	48°	48°	58°

Outriggers partially extended 5.2m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	2.60	2.20	1.80	1.60	1.00	83.0	1.70	1.40	1.00	0.70	0.50
80.0	2.60	2.20	1.80	1.60	1.00	80.0	1.70	1.40	0.96	0.70	0.50
75.0	2.60	2.20	1.80	1.60	1.00	75.0	1.70	1.32	0.87	0.69	0.50
72.0	2.60	2.20	1.80	1.51	0.88	72.0	1.45	1.10	0.83	0.66	0.48
70.0	2.55	2.15	1.80	1.46	0.86	70.0	1.30	1.02	0.80	0.64	0.47
65.0	1.90	1.76	1.57	1.33	0.81	65.0	1.05	0.87	0.72	0.59	0.43
60.0	1.22	1.15	1.07	1.02	0.78	60.0	0.86	0.78	0.66	0.56	0.40
55.0	0.68	0.66	0.61	0.60		55.0	0.45	0.45	0.42	0.40	
52.0	0.45	0.43	0.40	0.37							
Danger angle	50°	50°	50°	50°	58°	Danger angle	53°	53°	53°	53°	58°

AD62227B

- Power tilt jib operations with outriggers set (32.0 m (104 ft 11 in) boom + auxiliary jib operation)

(Unit : ton)

Outriggers partially extended 4.5m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	2.60	2.20	1.80	1.60	1.00	83.0	1.70	1.40	1.10	0.70	0.50
80.0	2.60	2.20	1.80	1.60	1.00	80.0	1.70	1.40	0.96	0.70	0.50
75.0	2.60	2.20	1.80	1.60	1.00	75.0	1.70	1.32	0.87	0.69	0.50
72.0	2.60	2.20	1.80	1.51	0.88	72.0	1.45	1.10	0.83	0.66	0.48
70.0	2.30	2.10	1.80	1.46	0.86	70.0	1.30	1.02	0.80	0.64	0.47
65.0	1.40	1.35	1.25	1.20	0.81	65.0	1.05	0.87	0.72	0.59	0.43
60.0	0.76	0.72	0.68	0.65	0.63	60.0	0.51	0.47	0.46	0.40	
57.0	0.45	0.45	0.42	0.41							
Danger angle	55°	55°	55°	55°	58°	Danger angle	58°	58°	58°	58°	63°

Outriggers partially extended 3.8m (Over-side) X, H type											
Boom angle (°)	7.4m					Boom angle (°)	12.6m				
	Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°		Tilt 5°	Tilt 15°	Tilt 30°	Tilt 45°	Tilt 60°
83.0	2.60	2.20	1.80	1.60	1.00	83.0	1.70	1.40	1.00	0.70	0.50
80.0	2.60	2.20	1.80	1.60	1.00	80.0	1.70	1.40	0.96	0.70	0.50
75.0	2.60	2.20	1.80	1.60	1.00	75.0	1.70	1.32	0.87	0.69	0.50
72.0	2.15	1.95	1.69	1.51	0.88	72.0	1.45	1.10	0.83	0.66	0.48
70.0	1.73	1.60	1.45	1.35	0.86	70.0	1.30	1.02	0.80	0.64	0.47
65.0	0.90	0.84	0.76	0.70	0.69	65.0	0.58	0.58	0.50	0.45	
60.0	0.50	0.50	0.46	0.44							
Danger angle	60°	60°	60°	60°	63°	Danger angle	63°	63°	63°	63°	68°

AD62228B

RECAUTIONS

Precautions when using outriggers

(1) The rated total load indicates the value when installing the machines on a flat, hard surface using the outrigger. The values shown above the bold line are on the basis of strength and those below the line on the basis of crane stability.
(2) The rated total load includes both weights of sling assembly and hook (main hook: 240 kg (529 lb)and axially hook: 60 kg (132 lb)).
(3) The rated total load is also based on the minimum actual swing radius of the working equipment taking account of boom deflection.
(4) If the boom length exceeds the specified length, operate the machine using the smaller value between the specified value and the nearest upper boom length.
(5) For the single top, the rated total load must be equal to the value subtracted 200 kg (441 lb) from the rated total load for the boom and always be limited to 3.0 tons.
(6) For auxiliary-jib operation, operate the machine using the rated total load of 30.5 m (100 ft) boom for 30.5 m (100 ft)or less and 32.0 m (104 ft 11 in) boom for over 30.5 m (100 ft) and referring only to the boom angle.
(7) The numbers of standard winding wire rope for hook to the boom length are shown below. The allowable load for each wire rope must not be more than 3.25 tons for the main hoisting winch and not more than 3.0 tons for the auxiliary winch.

Boom length (m)	7.6 to 13.7	Over 13.7 to 19.8	Over 19.8 to 32.0	Auxiliary jib Single top
No. of winding	8	6	4	1

(8) Never use free-fall operation as a rule except when lowering the hook only. If an load is unavoidably lowered with free-fall operation, the load must be limited to 1/5 of the rated total load and never apply sudden braking.
(9) When operating the boom attached with the auxiliary jib, subtract 1,500 kg (3,310 lb) as well as the sling assembly weight from the rated total load.
(10) Since tilting the boom with the specified angle can cause tipping over without load, special attention must be paid for machine operation.
(11) For hoisting operation at the front or rear working area, refer the rated total load chart on "Maximum outrigger extension".
(12) If operating the machine incorrectly or exceeding the rated total load, the machine can be tipped over or damaged.
In such cases, the guarantee is void.

Precautions when using no outriggers

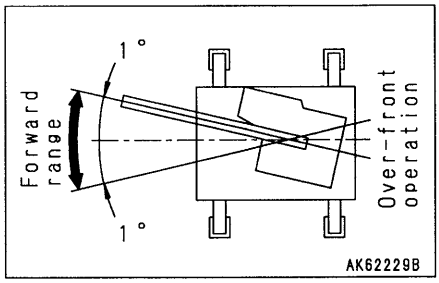
(1) The rated total load indicates the value at the specified inflation pressure on a flat and hard surface and when fully retracting the suspension cylinder. The values shown above the bold line are on the basis of strength and those below the line on the basis of crane stability.
Operate the machine on site taking account of ground, working conditions etc.

Specified tire inflation pressure 0.9 MPa (9.0 kgf/cm^2)

(2) The rated total load includes both weights of sling assembly and hook (main hook: 240 kg (529 lb) and auxiliary hook: 60 kg (132 lb)).
(3) The rated total load is also based on the minimum actual swing radius of the working equipment taking account of the deflection of the boom and tires.
(4) If the boom length exceeds the specified length, operate the machine using the smaller value between the specified value and the nearest upper boom length.
(5) For the single top, the rated total load must be equal to the value subtracted 200 kg (441 lb) from the rated total load for the boom and always be limited to 3.0 tons.
(6) Never perform operation using the boom length exceeding 25.9 m (84 ft 11 in), auxiliary jib operation and hydraulic drift operation.
(7) The numbers of standard winding wire rope for hook to the boom length are shown below. The allowable load for each wire rope must not be more than 3.25 tons for the main hoisting winch and not more than 3.0 tons for the auxiliary winch.

Boom length (m)	7.6 to 13.7	Over 13.7 to 19.8	Over 19.8 to 32.0	Single top
No. of winding	8	6	4	1

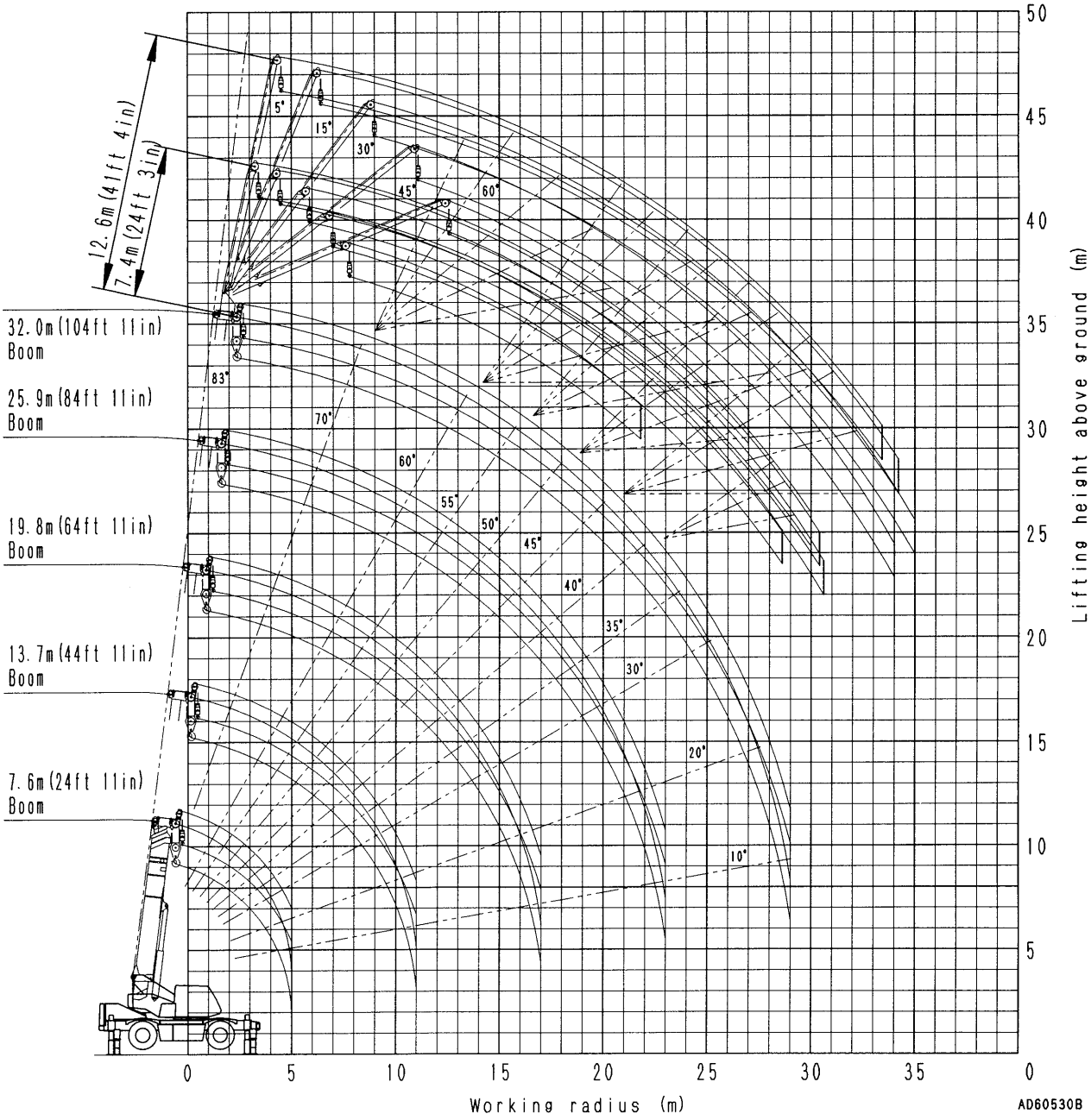
(8) The over-front operation differs from the 360° operation in the rated total load. When the crane swing from the forward range to the sideward range, take special care for the overload.
Perform the over-front operation where the boom from the machine center is within 1° (shown in the below figure).



(9) When performing the stationary crane operation, always apply the parking brake.
(10) When traveling with a raised load, apply the swing brake, hold the load near the ground not to swing it, and travel at the speed less than 1.6 km/h (1 MPH).
Especially avoid the abrupt braking and performing the crane operation while traveling.
(11) When the boom angle becomes less than the danger angle, the machine tips over without load. Therefore take care for this condition.
(12) If operating the machine beyond the rated total load or incorrectly, the machine can be tipped or damaged.
In such cases, the guarantee is void.

Working radius/lifting height chart
The chart below shows the relationship between the operating radius and lifting height when the outriggers are fully extended.
The value given does not include the deflection of the boom and jib.

- Power tilt jib specification machines



MACHINE EQUIPPED WITH MANUAL TILT JIB

When using a machine equipped with manual tilt jib, read this section.
(The only operation method difference from machine equipped with power tilt jib is explained.)

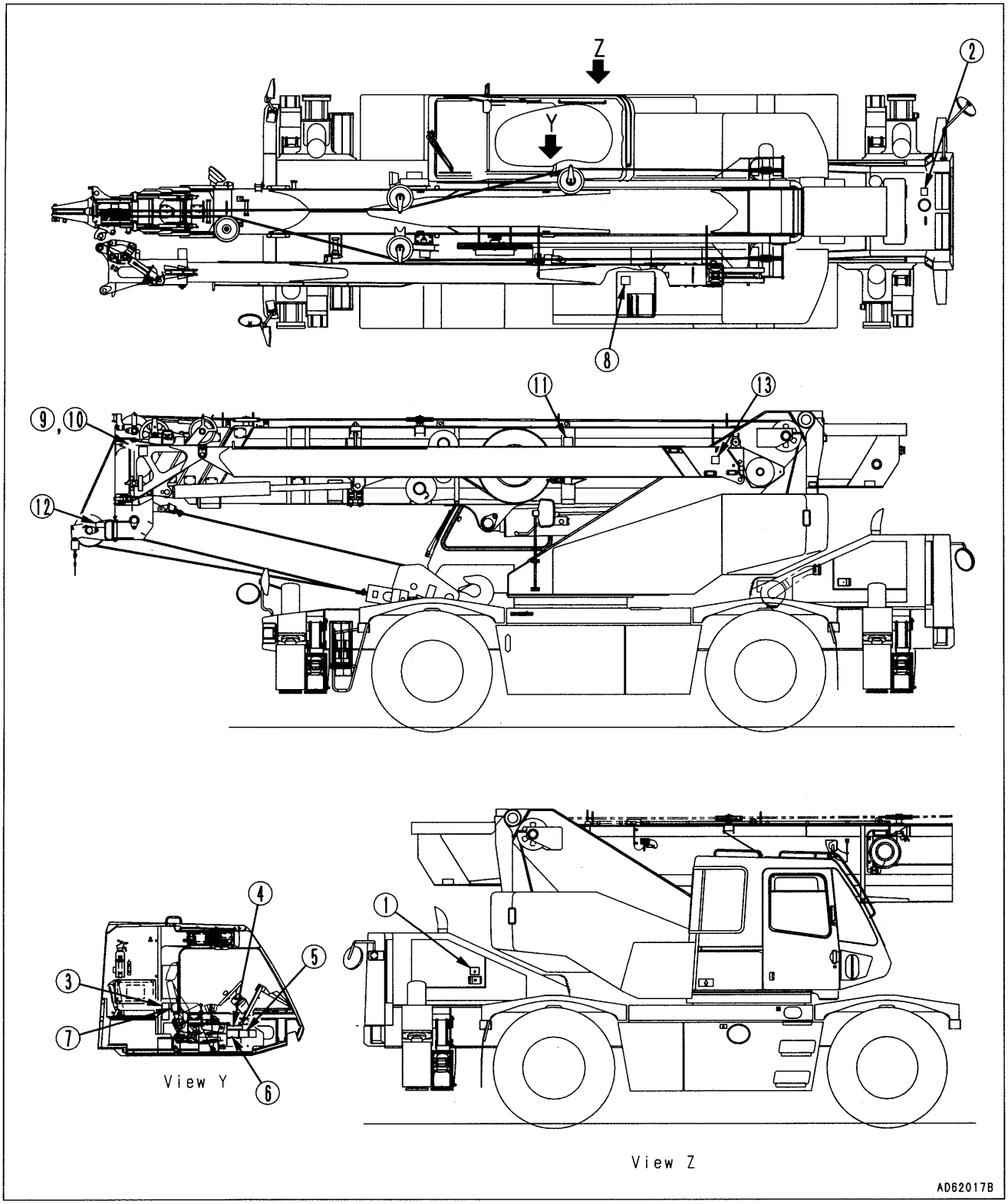
25. POSITION FOR ATTACHING SAFETY LABELS

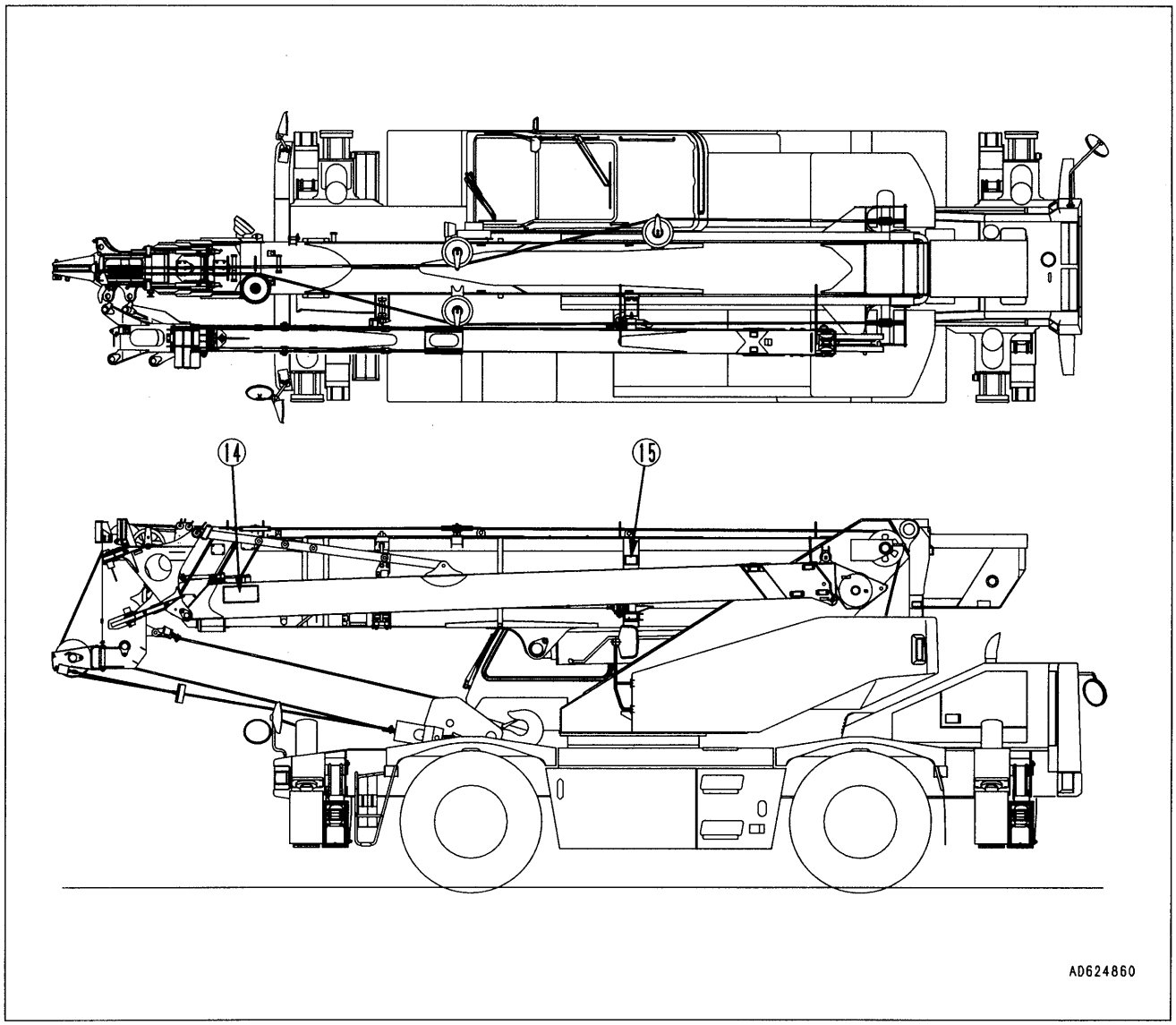
Always keep these labels clean. If they are lost or damaged, attch them again or replace them with new labels.

There are other labels in addition to the safety labels listed as follows, so handle them in the same way.

Safety labels may be available in languages other than English. To find out what labels are available, contact your Komatsu distributor.

25.1 POSITION FOR ATTACHING SAFETY LABELS

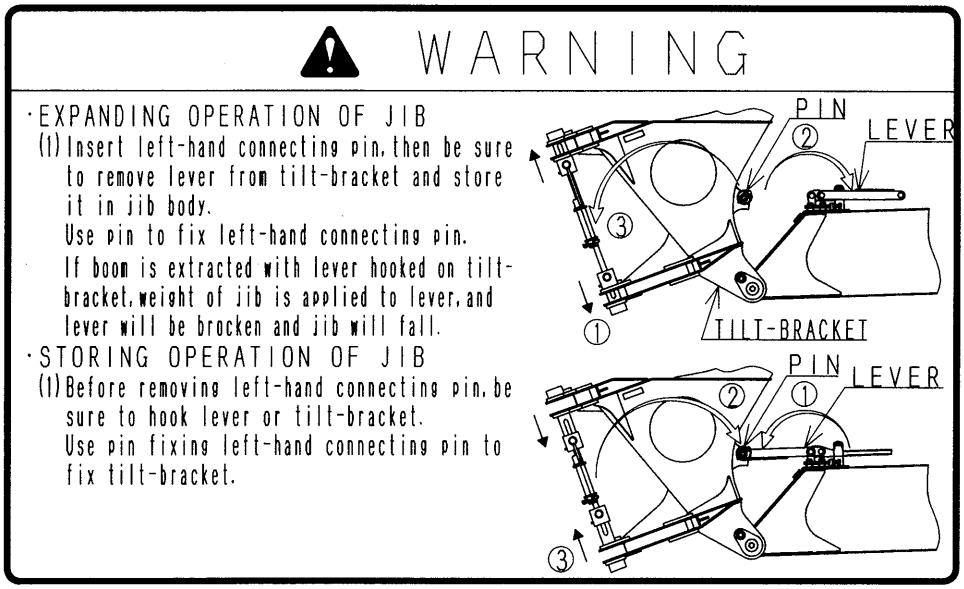



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⑮
AD624860

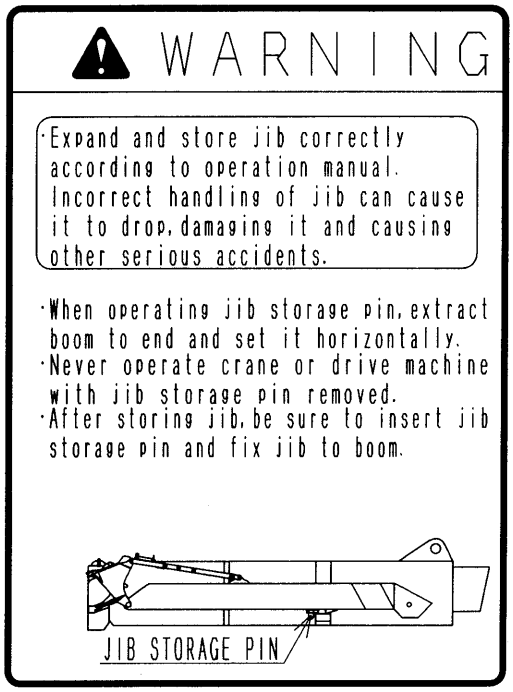
1. Precautions while engine is running
2. Precautions for hot coolant
3. Precautions for forwarding and reversing the machine
4. Precautions when canceling the moment limiter
5. Precautions when operating outriggers
6. Precautions for high voltage
7. Precautions when operating and carrying out maintenance
8. Precautions when handling an accumulator
9. Precautions when telescoping jib connecting pin cylinder (Left side)
10. Precautions when telescoping jib connecting pin cylinder (Right side)
11. Precautions when expanding and storing jib
12. Precautions when storing single top with jib expanded or stored
13. Precautions when expanding second job

Safety labels 9, 10, and 11 are not stuck to the machine equipped with manual tilt jib. For details, see the section of safety.

14. Precautions when operating to expanding and storing jib



15. Precautions when expanding and storing jib



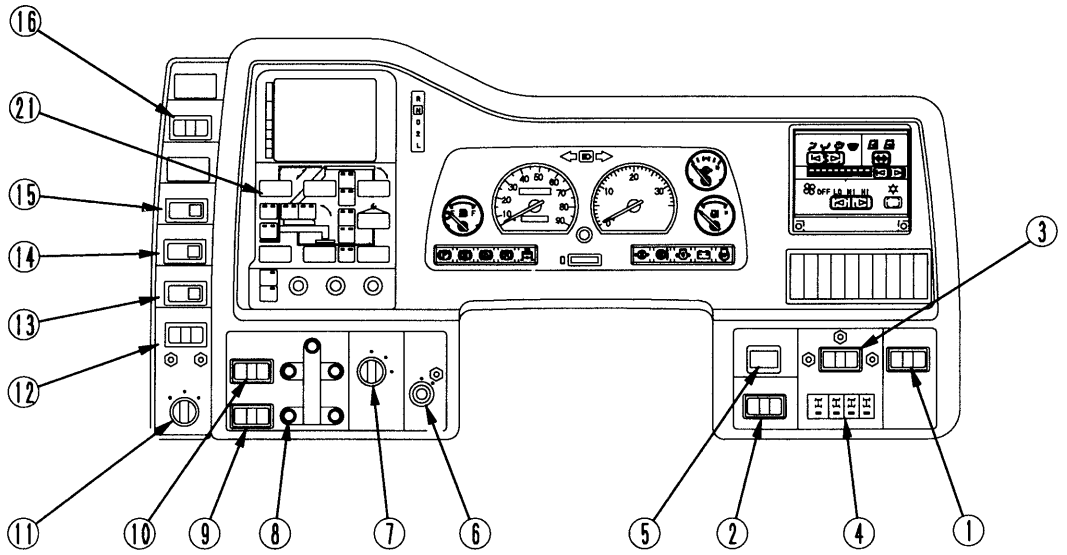
AD62487B

For safety labels 1 through 8, please request as Part No. 23S-V11-5110.
For safety labels 12 through 15, please request as Part No. 23S-V11-5130.

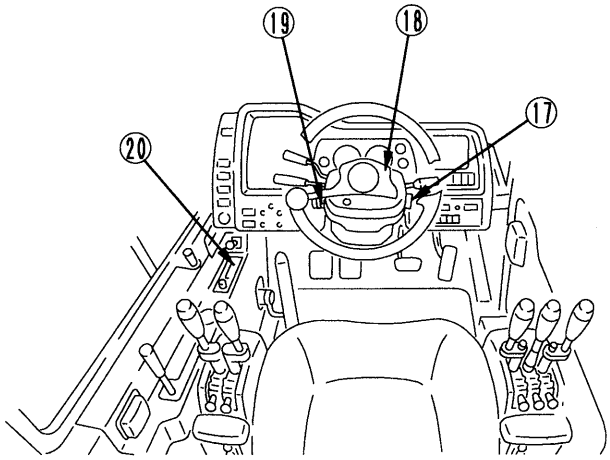
26. EXPLANATION OF COMPONENTS

26.1 FRONT PANEL GROUP

26.1.1 SWITCH



AD62021B



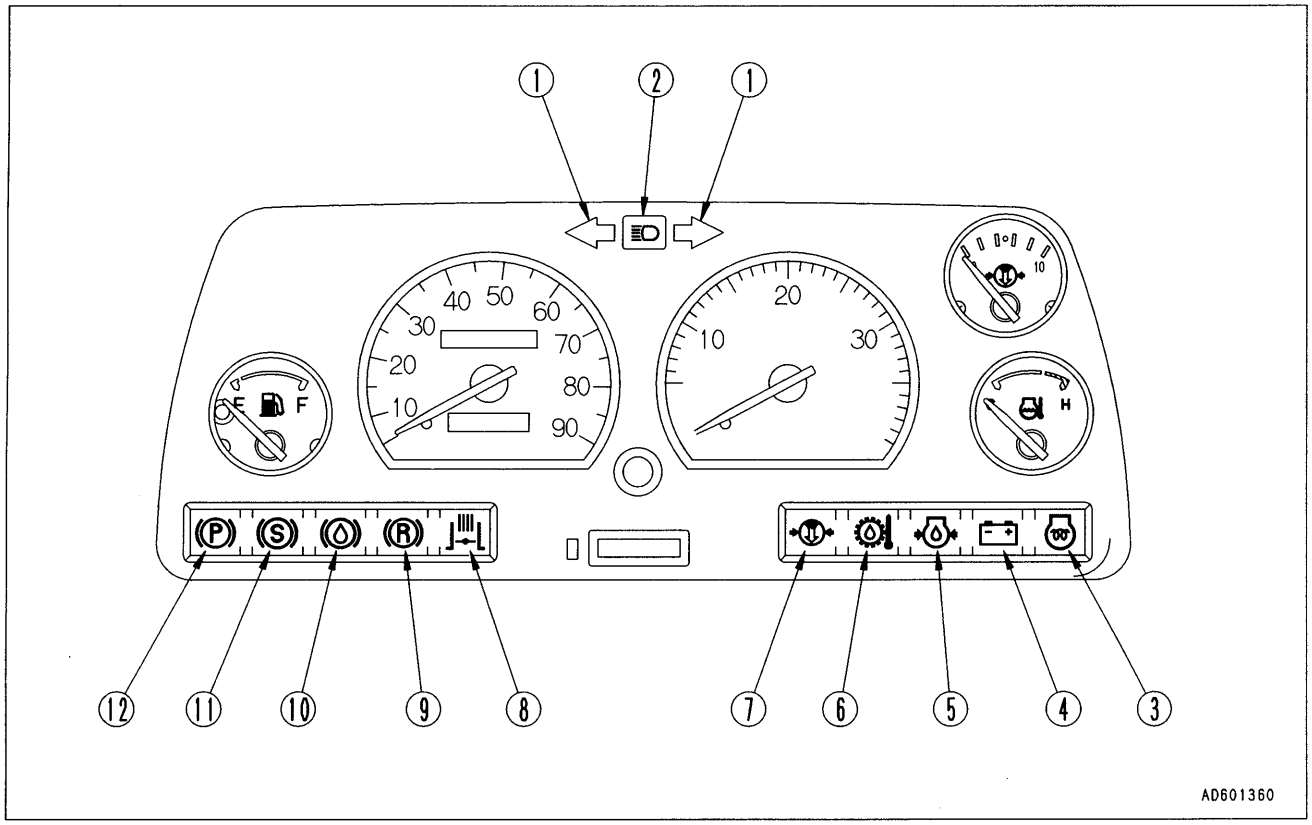
AD620220

1. PARKING BRAKE SWITCH
2. TRAVELING MODE SWITCH
3. REAR STEERING LOCK CONTROL SWITCH
4. STEERING MODE SWITCH
5. EMERGENCY STEERING SWITCH
6. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) CANCEL SWITCH
7. PTO SWITCH
8. OUTRIGGER CONTROL SWITCH
9. OUTRIGGER SLIDER/JACK SELECTOR SWITCH
10. OUTRIGGER EXTEND/RETRACT SELECTOR SWITCH

11. JIB MODE SWITCH
12. JIB EXPAND/RETRACT SWITCH
13. SWING BRAKE SWITCH
14. SWING FREE SWITCH
15. PEDAL SWITCH
16. BOOM SELECTOR SWITCH
17. STARTING SWITCH
18. HAZARD SWITCH
19. WIPER, WASHER SWITCH
20. RADIO
21. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)

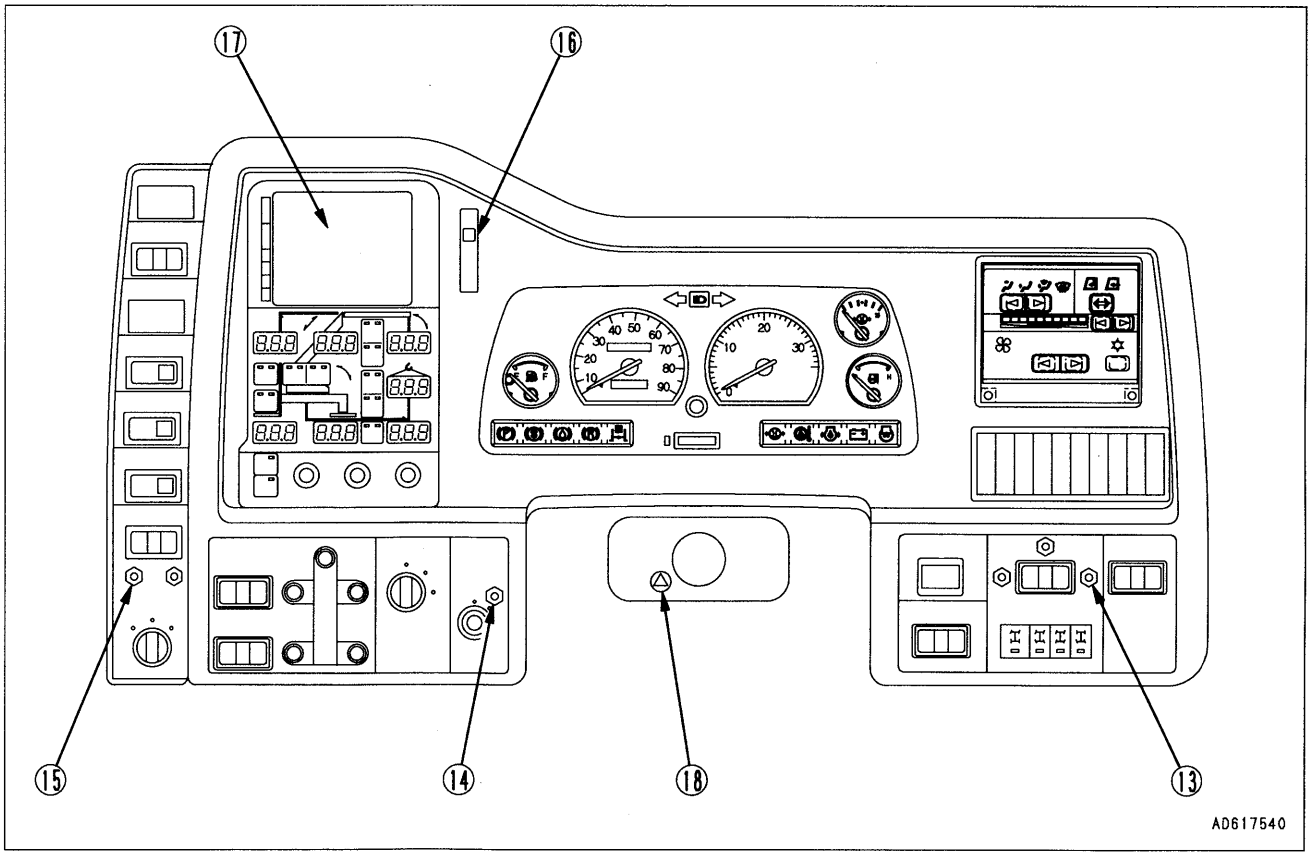
11 and 12 are not installed to the machine equipped with manual tilt jib. For the details, see the operation section.

26.1.2 LAMPS



1. **TURN SIGNAL INDICATOR PILOT LAMPS**
2. **HIGH BEAM PILOT LAMP**
3. **GLOW LAMP (RED)**
4. **BATTERY CHARGE CAUTION LAMP (RED)**
5. **ENGINE OIL PRESSURE CAUTION LAMP (RED)**
6. **TORQUE CONVERTER OVERHEAT CAUTION LAMP (RED)**
7. **AIR PRESSURE CAUTION LAMP (RED)**
8. **EXHAUST BRAKE INDICATOR LAMP (ORANGE)**
9. **MAGNETIC RETARDER INDICATOR LAMP (ORANGE) (OPTION)**
10. **BRAKE OIL LEVEL CAUTION LAMP (RED)**
11. **AUXILIARY BRAKE INDICATOR LAMP (RED)**
12. **PARKING BRAKE INDICATOR LAMP (RED)**

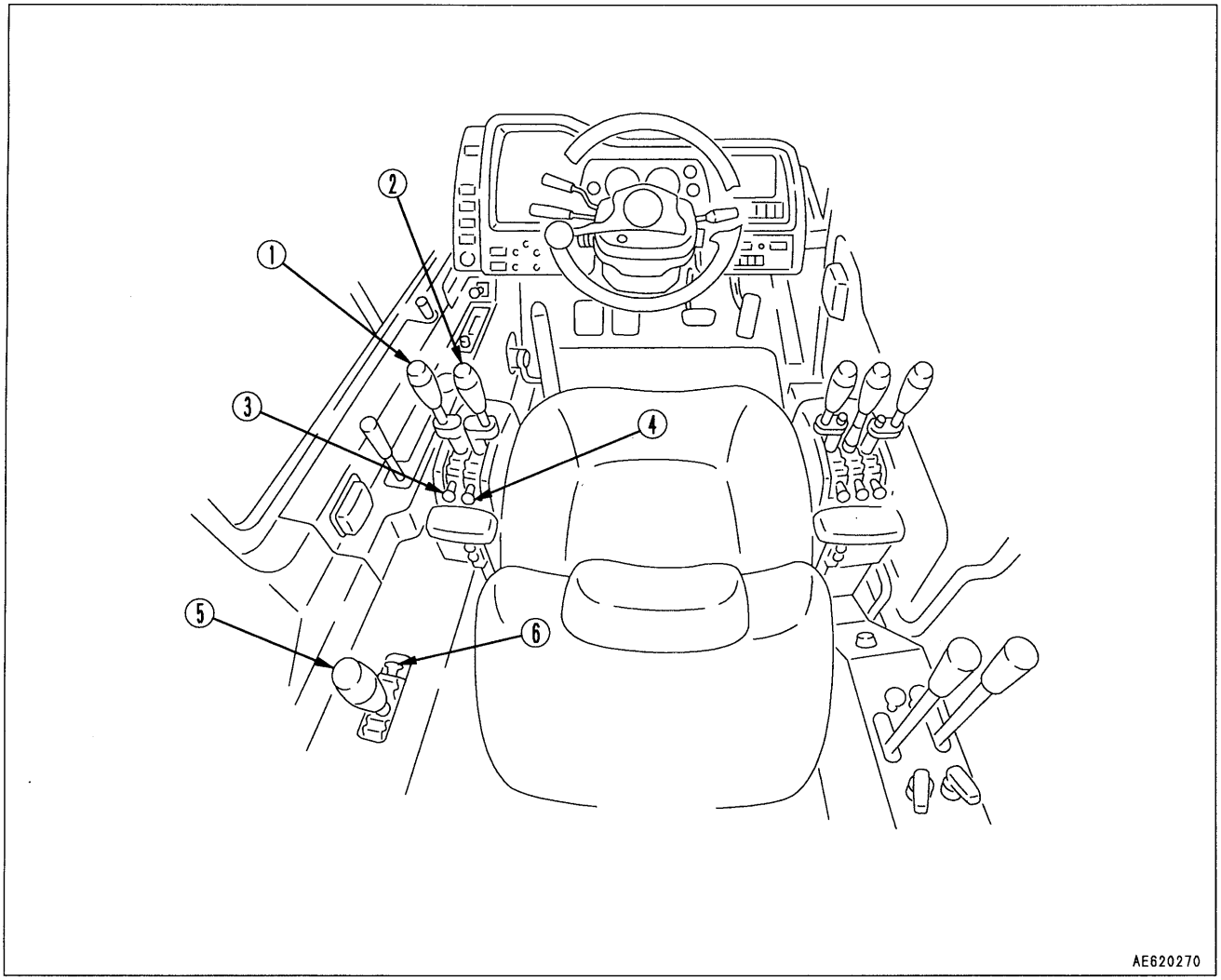
For the details, see the operation section.



13. REAR STEERING LOCK INDICATOR LAMP
14. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM) CANCEL INDICATOR (RED)
15. LEFT PIN LOCK COMPLETION INDICATOR LAMP (GREEN)
JIB STOW COMPLETION INDICATOR LAMP (GREEN)
16. GEAR SHIFT LEVER POSITION INDICATOR
17. MOMENT LIMITER (OVERLOAD PREVENTION SYSTEM)
GRAPHIC DISPLAY CONCENTRATED DISPLAY
18. HAZARD SWITCH INDICATOR (RED)

15 is not installed to the machine equipped with manual tilt jib.
For the details, see the operation section.

26.2 SIDE PANEL GROUP
26.2.1 LEFT SIDE PANEL



1. **SWING CONTROL LEVER (WITH HORN SWITCH)**
2. **POWER TILT JIB CONTROL LEVER**
3. **SWING CONTROL LEVER LOCK KNOB**
4. **POWER TILT JIB CONTROL LEVER LOCK KNOB**
5. **BOOM TELESCOPE CONTROL LEVER**
6. **BOOM TELESCOPE CONTROL LEVER LOCK KNOB**

2 and 4 are not installed to the machine equipped with manual tilt jib.
For details, see the operation section.

27. OPERATION

27.1 HANDLING JIB

⚠ WARNING

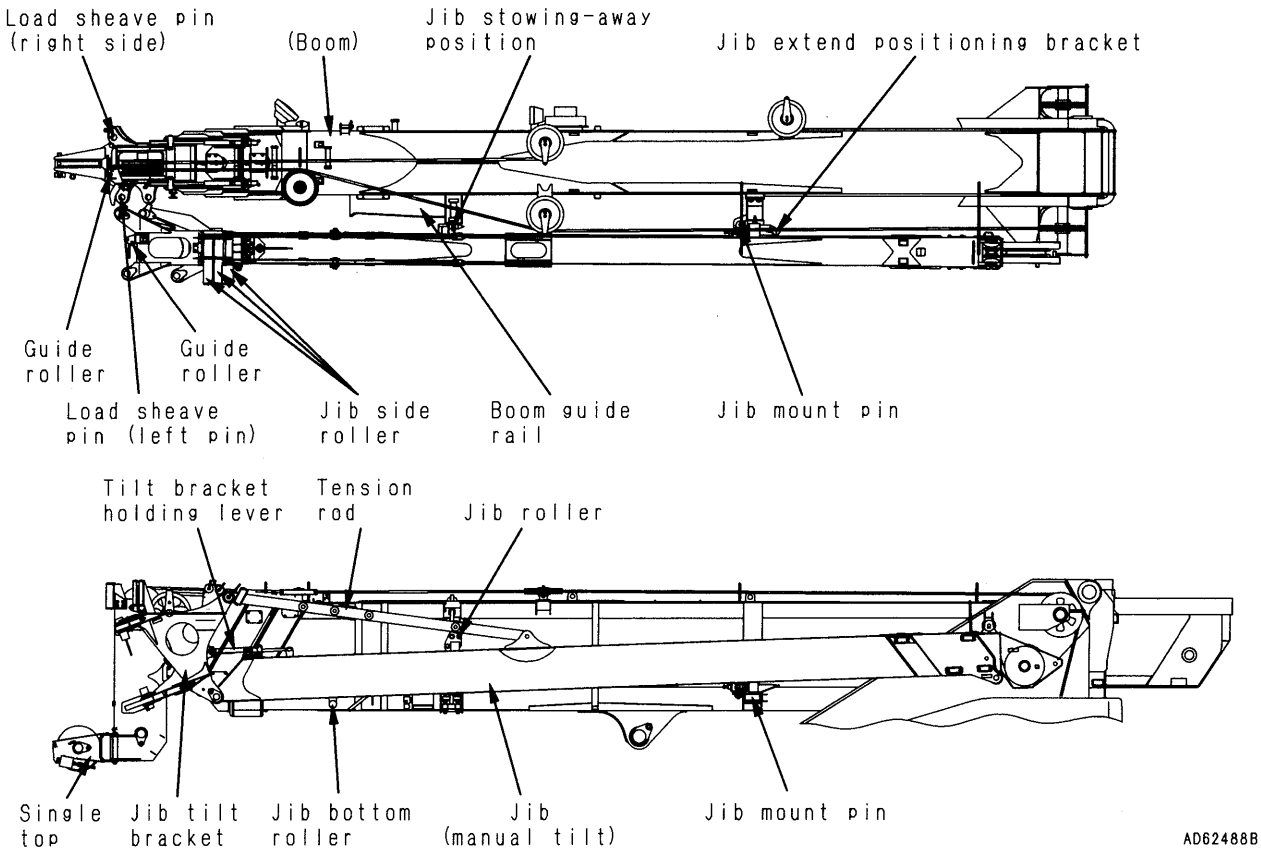
When carrying out jib operations, always follow the rated overall load table.

The following section gives procedure for installing, stowing away and tilting the jib, etc. for manual tilt jib.

Order

- Names of parts needed when extending and stowing away jib 5-11
- Precautions when handling jib 5-12
- Precautions when extending and stowing away jib 5-13
- Description for the jib extending and stowing-away units 5-14
- Extending jib 5-15
- Stowing away jib 5-26
- Extending top jib 5-35
- Retracting top jib 5-36

27.1.1 NAMES OF PARTS NEEDED WHEN EXTENDING AND STOWING AWAY JIB

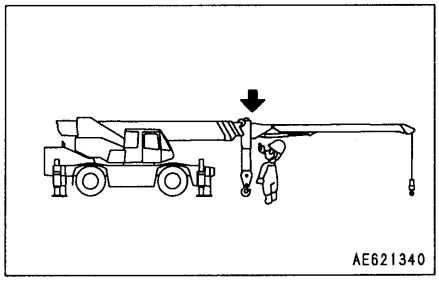


27.1.2 PRECAUTIONS WHEN HANDLING JIB

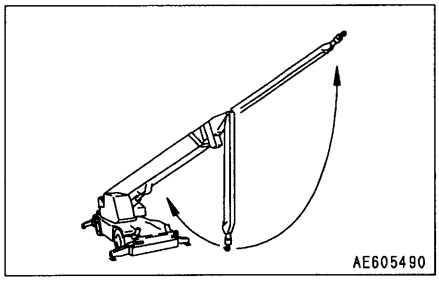
Operate the jib observing the following precautions.

⚠ CAUTION

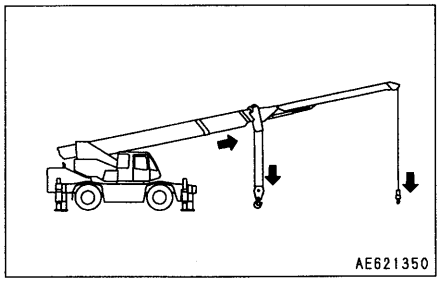
- **Check that the pins have been completely inserted or removed.**



- **Check that there is no obstacle in the range for extending the jib.**
  Make sure that there is space more than 19 m (62 ft 4 in) from the swing center forward the boom.



- **When extending the boom, be careful not to overwind the auxiliary hook and main hook.**
- **Jib operations cannot be carried out when the outriggers are not extended (on-tire operations).**
  Always set the outriggers.
- **When setting the crane, use the outriggers on the hard ground and set the crane horizontally.**



- **In strong wind, do not extend or stow-away jib to prevent dangerous swinging.**

27.1.3 PRECAUTIONS WHEN EXTENDING AND STOWING AWAY JIB

Operate the jib extending and stowing-away operations observing the following precautions.

⚠ WARNING

Automatic overwinding stop is not functioned when carrying out extending and stowing-away the jib. Be careful at that time.

⚠ CAUTION

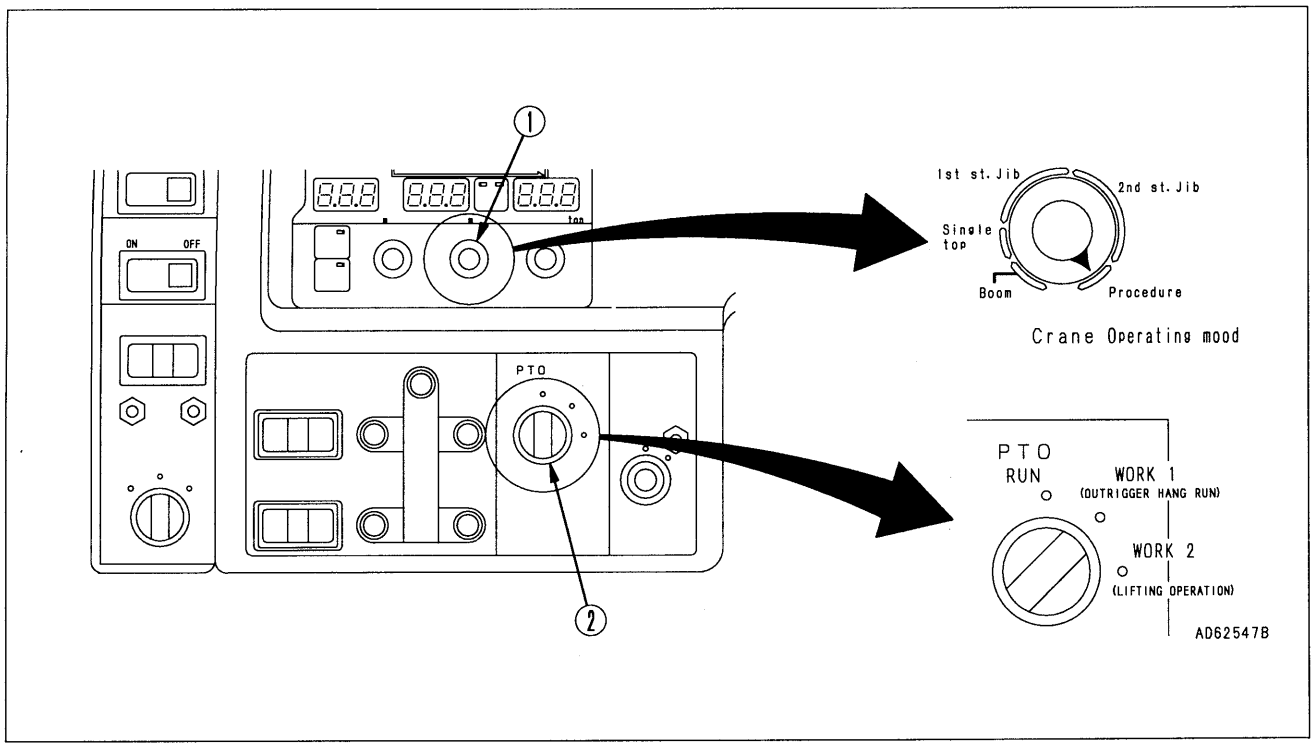
- **To prevent danger when extending and stowing-away the jib, "Automatic Stop System" is provided as follows.**
  If operation is automatically stopped, reset the operation to the normal conditions as follows and then operate the machine so as not to cause an automatic stop.

Automatic stop	Causes	Remedy
Boom raise stopped	Boom angle exceeds 80°	Lower the boom.
Boom extend stopped	Boom length exceeds 16 m (52 ft 6 in)	Retract the boom.

- **While extending and stowing away the jib, if the alarm buzzer sounds, this may indicate some form of incorrect operation.**
  In this case, return to the previous step and operate again.
- **When lowering the boom, the alarm buzzer sounds near the horizontal position. This does not indicate an abnormal condition but rather informs you that the position is "Horizontal".**

27.1.4 DESCRIPTION FOR JIB EXTENDING AND STOWING-AWAY UNITS

OPERATING PANEL FOR JIB EXTENDING AND STOWING-AWAY SWITCHES



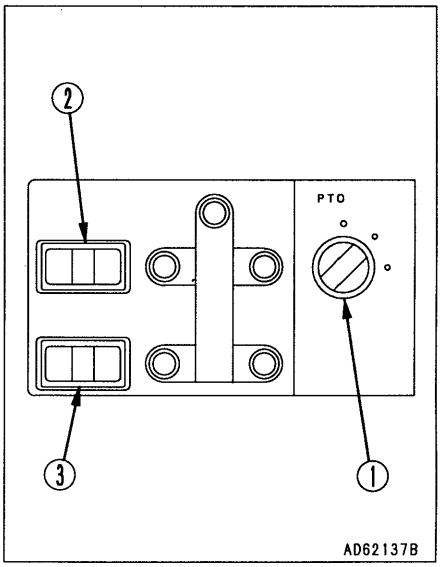
① MOMENT LIMITER (overload prevention system) crane operating mode switch
"Procedure" : This is used to extend and retract the jib.

② PTO SELECTOR SWITCH
"WORK 1" : This is used to extend and retract the jib.

27.1.5 EXTENDING JIB

⚠ WARNING

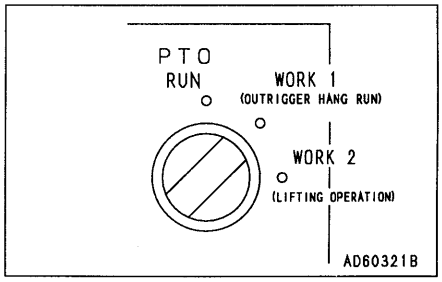
- **Extend the outriggers before extending the jib. Otherwise, it is impossible to extend jib.**
- **When extending the jib, never enter the front area or under the jib. The jib movement could cause injury.**
- **When operating the machine on a high place, always use a working bench and be careful not to fall.**
- **When climbing crane carrier or swing table , always use the specified step or a working bench.**
  Never climb upper face of outriggers to prevent danger such as slip.
- **If procedure is carried out in incorrect order when extending or retracting jib, the jib could be damaged. Always follow steps of procedure.**



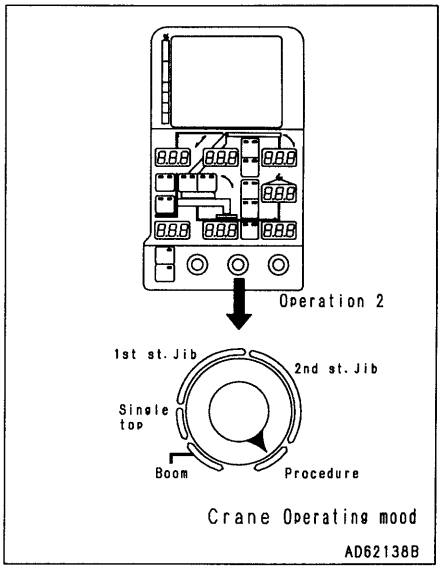
1. **Set the machine to the front leaning posture in the following procedures.**

⚠ CAUTION

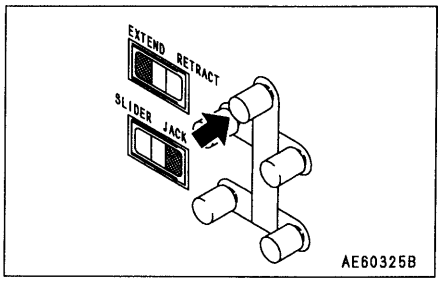
If the jib is extended while the machine inclines laterally, excessive load due to unexpected swing could damage or deform the jib.



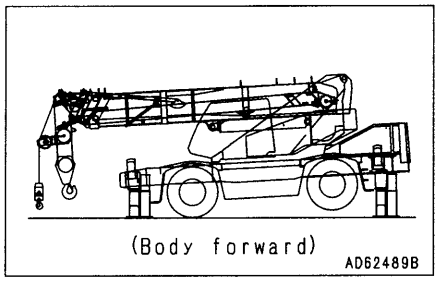
1. Set PTO switch ① to "WORK 1".
2. Set the MOMENT LIMITER (overload prevention system) crane operating mode switch to "Procedure".

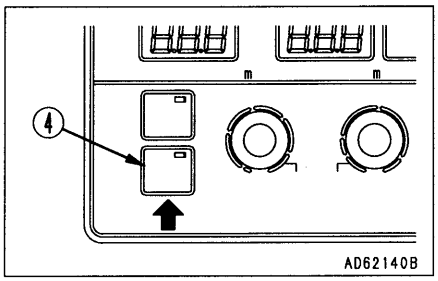


3. Operate outrigger extending/retracting selector switch ② and slider/jack selector switch ③ to extend the outriggers.
   At this time, extend the jack cylinder to the maximum.



4. After the outriggers are extended, retract the front outrigger jack cylinder to lean the body forward within 3°.
   Then press setting switch ④ of MOMENT LIMITER (overload prevention system) and re-set the extending width of the outriggers.



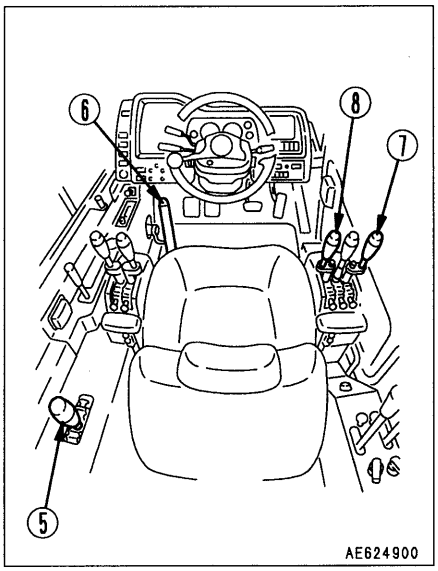


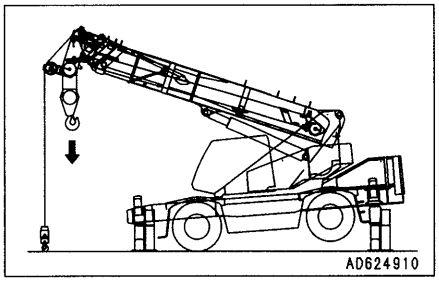
2. Lower the auxiliary hook on the ground in the following procedures.

1. Use either boom telescope lever ⑤ or pedal ⑥ after setting the pedal selector switch to the "ELASTICITY".

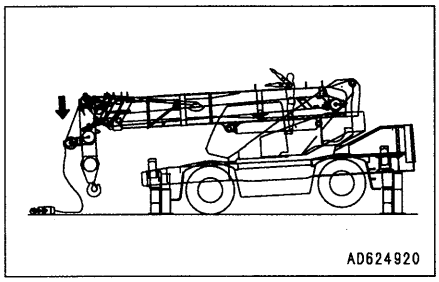
2. Operate boom hoist lever ⑦ to raise the boom up to approx "18°".

3. Operate auxiliary winch lever ⑧ to lower the auxiliary hook and place it on the ground to slack the rope.





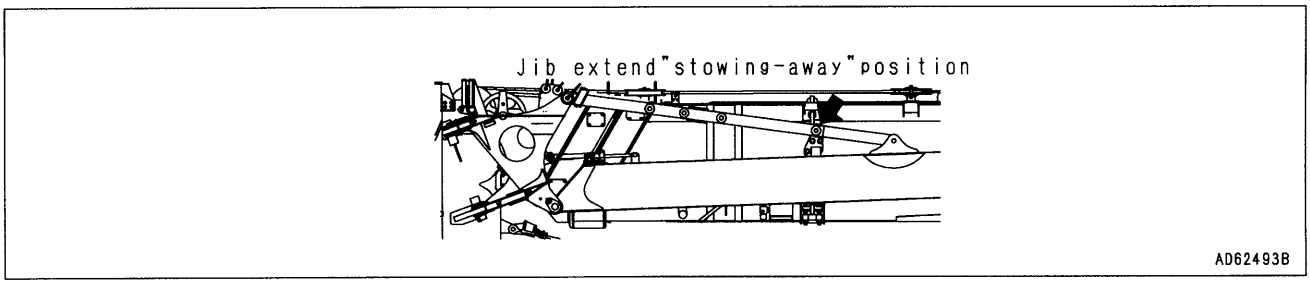
4. When in this state, operate the boom hoist lever to lower the boom fully.



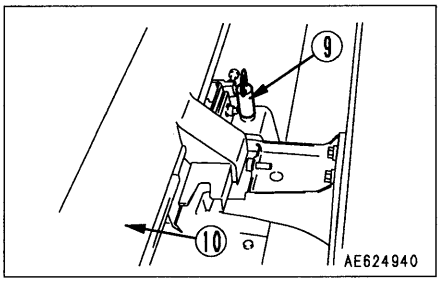
3. Extend the jib in the following procedures.

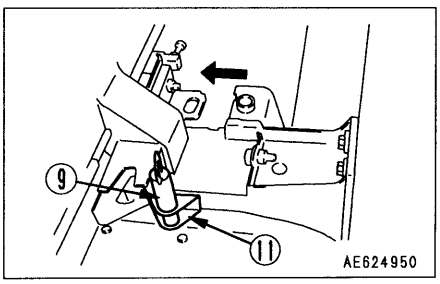
⚠ CAUTION

Before extending the jib, make sure that the pin of the jib tension bar is set to the "STOW" position.



1. Remove jib stowing pin ⑨ and extend jib ⑩ until the other end of the jib contacts with the stopper bolt. Then align the left pin with the hole on the boom.
2. Place the removed pin ⑨ on positioning bracket ⑪.





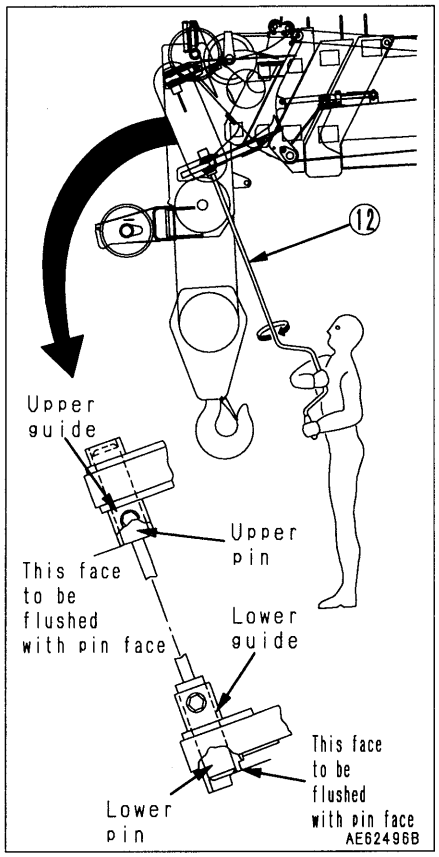
4. Insert the jib left pin in the following procedures.

⚠ WARNING

Screw the upper pin of the jib left side until pin's bottom is flush with the the upper guide bottom and the jib left lower pin until its bottom is flush with the face of the lower guide notch.
If extending the boom while the left side pins are not inserted into the boom and jib bracket in place, the jib will fall away.

1. The revo-frame is installed on the left side face. Pull out the handle ⑫ . At the same time, take out the ladder.

2. After inserting the handle ⑫ from the bottom of the left pin, turn the handle clockwise to insert the pin.
   Turns of the handle: approx. 35 (for reference only)



5. Remove the tilt bracket lock lever.

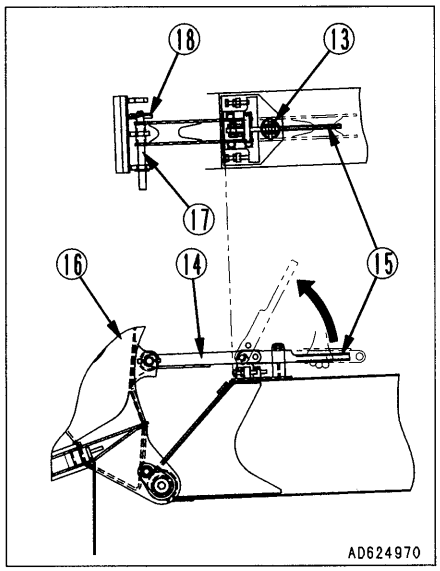
⚠ WARNING

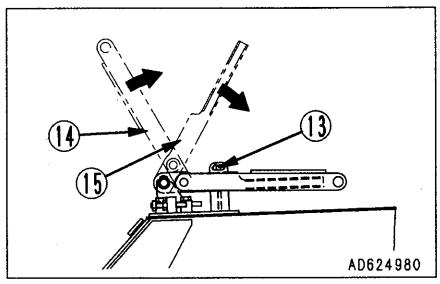
If the boom is extended while the tilt bracket lock lever is applied, the lever can be damaged by jib weight.

1. Remove linch-pin ⑬ and lift handle ⑮ of tilt bracket lock lever ⑭.

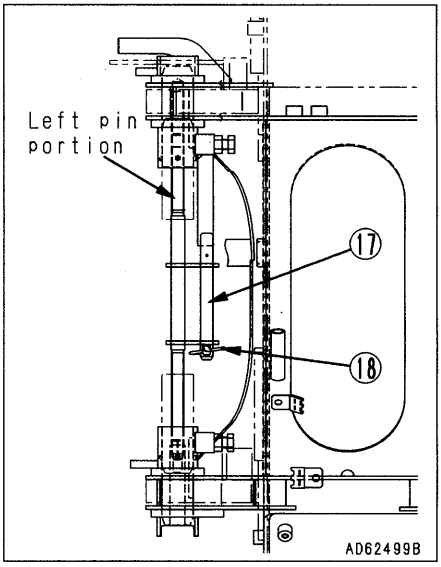
2. Remove linch-pin ⑱ from lock pin ⑰ on the tilt bracket ⑯ side and then remove pin ⑰. Tilt lock lever ⑭ to the jib side.

3. Push handle ⑮ to the jib side. Stow away the handle together with lock lever ⑭ . Lock them with linch-pin ⑬.





4. Install removed lock pin ⑰ into the hole on the lock plate, as a set-screw for the left pin inserted at procedure 4 , and then lock with linch-pin ⑱.

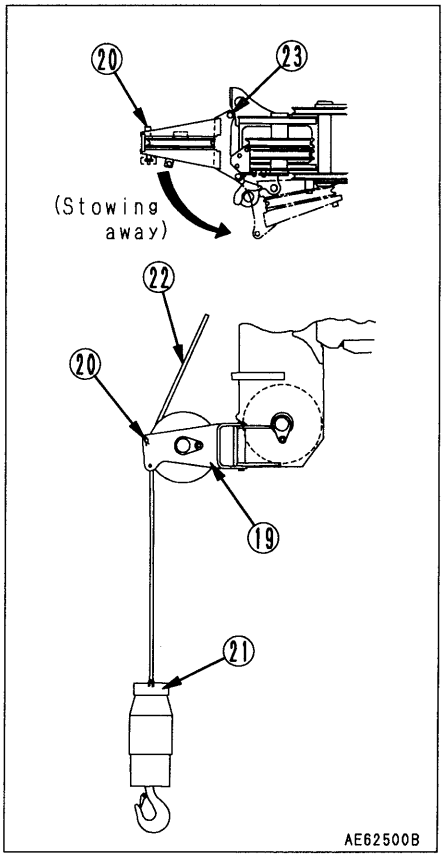


6. **Stow away the single top in the following procedures.**

⚠ CAUTION

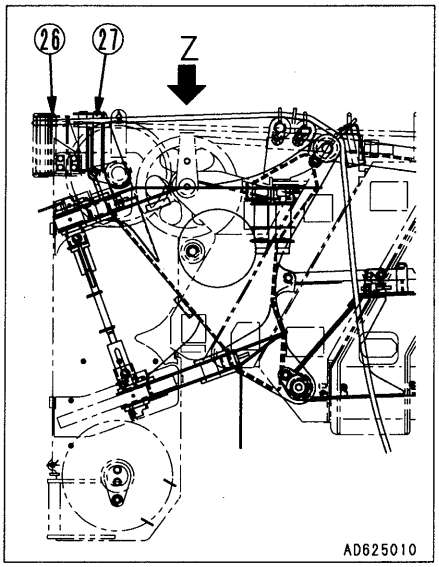
If telescoping the jib while extending the single top, the jib bracket strikes the single top and it can be damaged. Special care must be taken.

1. Remove rope guide pin ⑳ of single top ⑲.
2. Remove overwind detection weight ㉑ from the single top.
3. Remove rope ㉒ from the single top. Install the rope guide pin ⑳ on the home position again.
4. Remove lock pin ㉓ for the single top and stow it away. Then, lock the single top with the removed lock pin.

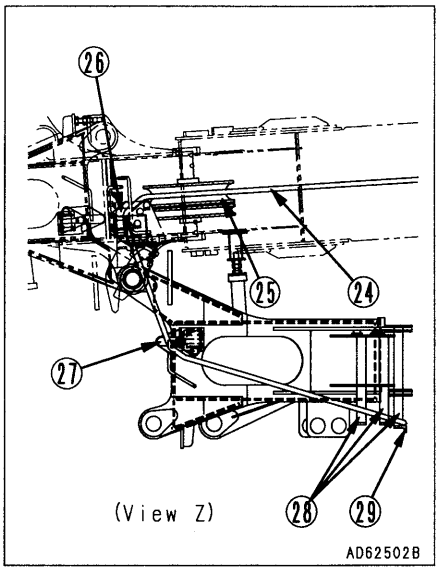


7. Pass the auxiliary rope in the following procedures.

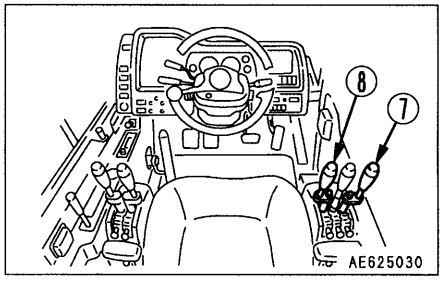
1. Pass auxiliary rope ㉔ on jib side roller ㉘ from boom idler sheave ㉕ through both of guide roller ㉖ and jib side guide roller ㉗, and pass the rope on rope guide plate ㉙.



2. Pull out the rope to eliminate slack.



8. Raise the boom in the following procedures.



⚠ WARNING

Never extend the boom before raising the boom to 78° to 80°. Otherwise the jib roller will be removed and the jib will fall away.

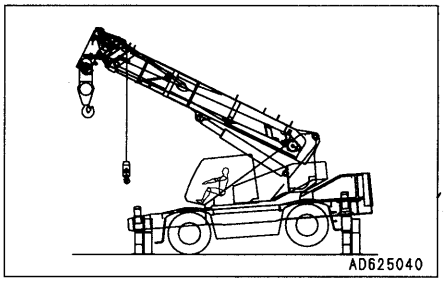
⚠ CAUTION

- **Take care not to strike the front bumper with the auxiliary hook.**
- **If the boom angle exceeds "80°", the alarm buzzer sounds and boom raising operation stops automatically.**

1. Operate boom hoist lever ⑦ to raise the boom up to approx. 10°.

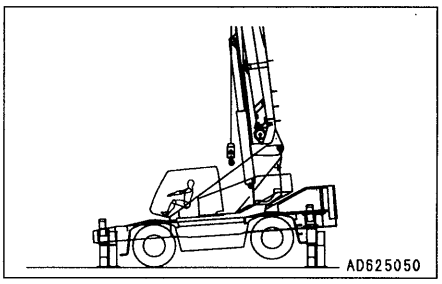
2. Operate auxiliary winch operation lever ⑧ to raise the auxiliary hook to the position higher than that of the front bumper.

3. Operate the boom hoist lever to raise the boom up to 78° to 80°. At this time, lower the auxiliary hook taking care not to contact the machine body and keep the hook below the jib tip. If the boom angle exceeds 80°, then the LED (red) on the switch lights up, the alarm buzzer sounds and "Stop! raise limit" appears on the graphics display; boom raising operation stops automatically.



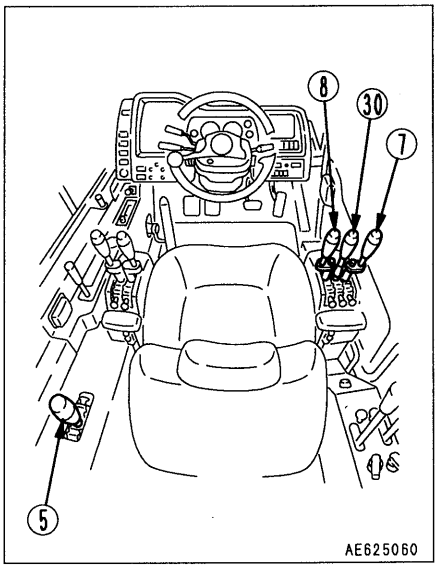
REMARKS

Just before the boom angle exceeds the set value, "Caution! raise limit" appears, the LED flashes and the buzzer sounds intermittently.

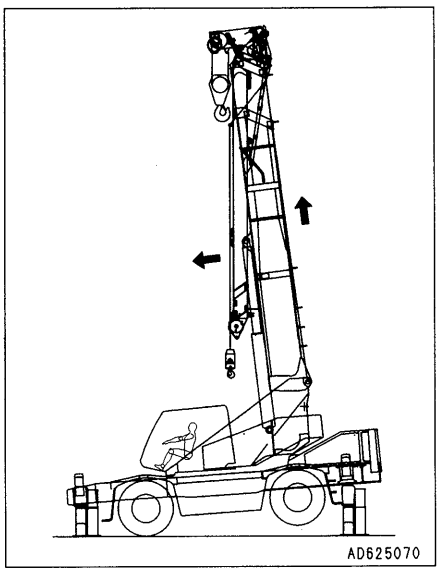


9. Extend the boom and spread the jib vertically using the following procedures.

1. Operate main winch operation lever ㉚, auxiliary winch operation lever ⑧ and boom telescope lever ⑤ to extend the boom up to approx. 8.6 m (28 ft 2 in) while winding out the main and auxiliary hooks.



2. The jib will be removed from the boom mount and be spread vertically.



10. Extend the boom up to 2nd stage while keeping the jib vertically and then lower the boom.

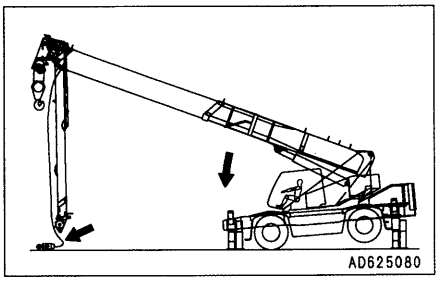
⚠ WARNING

- **Before extending the boom, be sure that there is no operator within the working area. Take care not to strike the machine body by the jib.**
- **When extending the boom, take care that the main hook is not wound excessively.**

1. Operate the boom telescope lever to extend the boom up to 2nd stage while winding out the auxiliary hook.

2. Operate boom hoist lever ⑦ to lower the boom up to approx. 26°. Operate the auxiliary winch lever to place the auxiliary hook on the ground.

3. Additionally, lower the boom to approx. 20°.

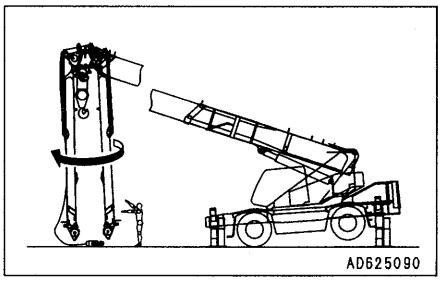


11. Rotate the jib in the following procedures.

⚠ CAUTION

Carry out boom lowering operations slowly to prevent the boom from rotating forward suddenly. Be careful about jib tip clearance to the ground.

Operate the boom hoist lever to lower the boom up to approx. 18°, then the jib will rotate forward. Otherwise, rotate the jib tip by hand.

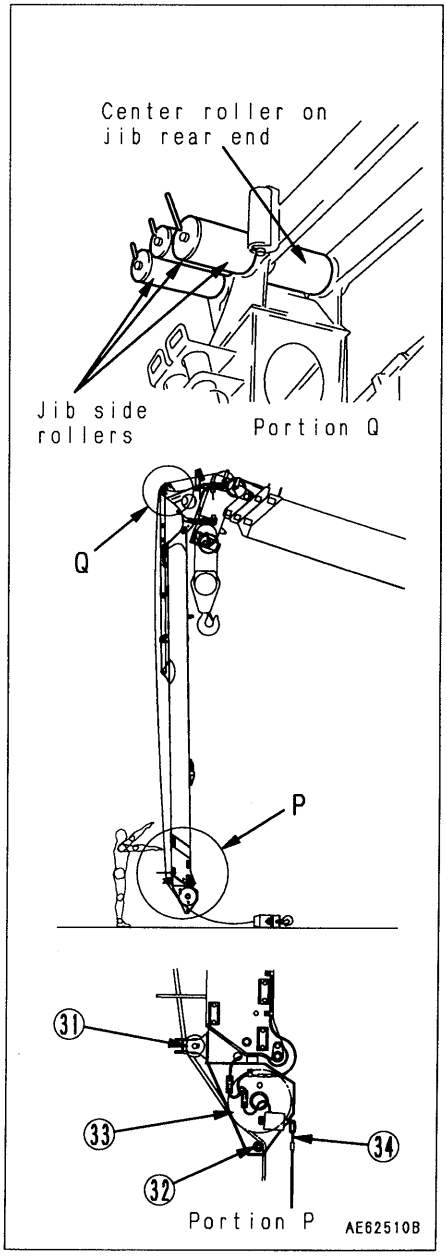


12. Pass the auxiliary rope on the jib tip sheave in the following procedures.

1. Remove the auxiliary rope from the jib bottom rollers, jib side rollers and rope guide plates. Pass the rope on the center roller located on the jib rear end.
2. Pass the auxiliary rope on jib idler sheave ㉛. Remove rope guide plate pin ㉜. Pass the rope jib tip sheave ㉝ and install guide pin ㉜.
3. Install the wire ㉞ of the overwind weight onto the overwind switch and jib.
4. After raising the boom to 25°, operate the auxiliary winch operation lever to wind in the auxiliary rope and contact the auxiliary hook to the jib tip.

NOTICE

Contact the overwind weight to the auxiliary hook upper face not to be removed the overwind weight of the auxiliary winch.



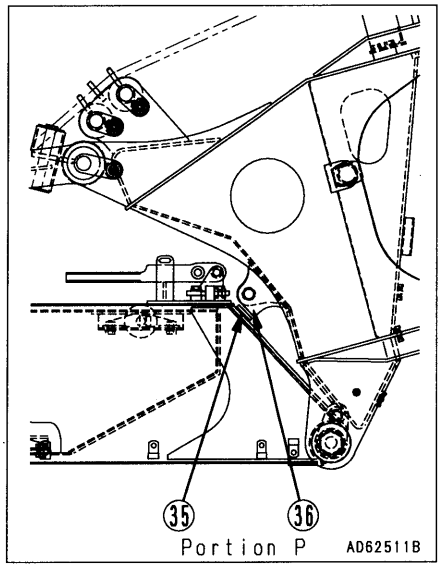
13. Extend the jib in the following procedures.

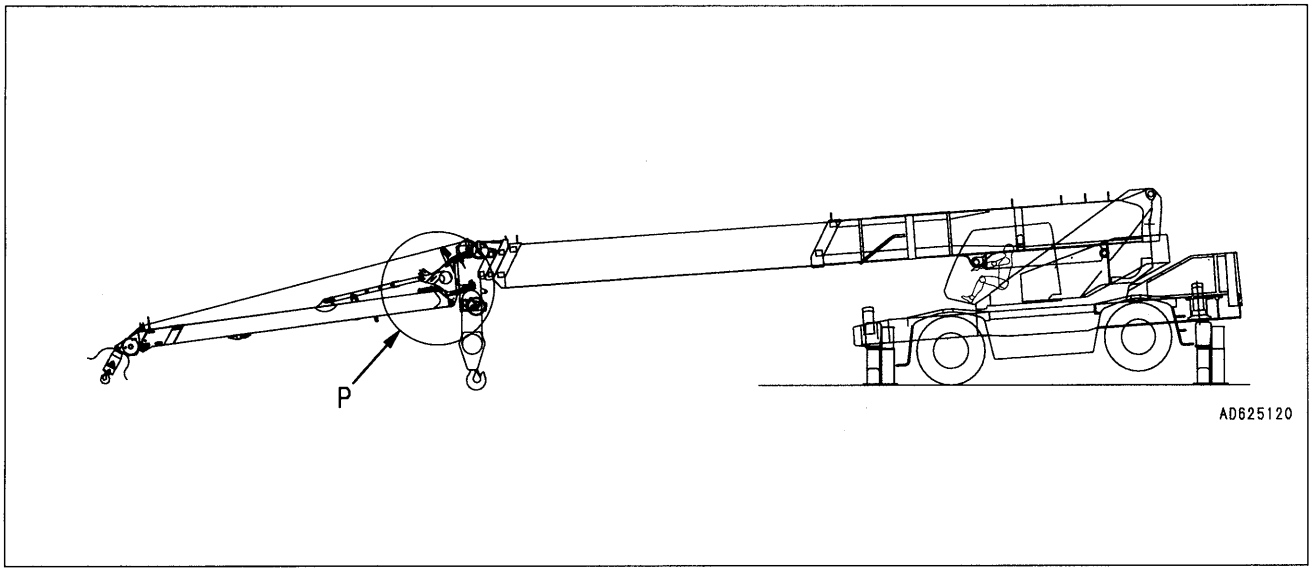
⚠ WARNING

- **Sudden winch operation may cause jib damage. Use the winch slowly while keeping engine idle.**
- **If the boom is lowered while the jib foot contacts to the tilt bracket stopper, the jib can be damaged by rope tension.**

1. To prevent the auxiliary winch from relieving, operate the auxiliary winch lever while lifting the auxiliary rope and extending the jib forward, and operate the boom hoist lever to lower the boom fully.

2. Keep the engine idle. Wind in the auxiliary rope slowly and contact jib foot ㉟ to tilt bracket stopper ㊱ while relieving the auxiliary winch.



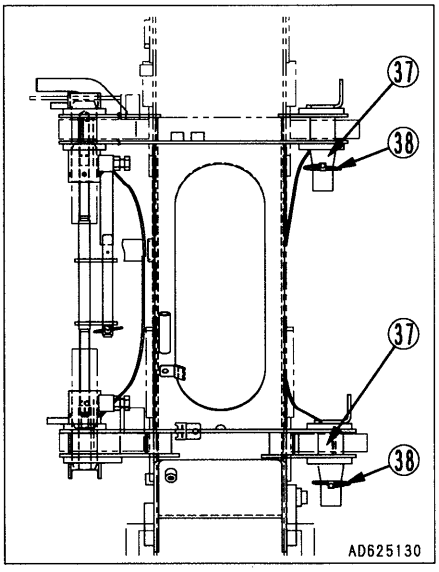


14. Insert the right pin.

⚠ WARNING

If operation is carried out while the right pin is not inserted in the jib bracket, the jib will fall.

Remove pin ㊲ mounted on the jib bracket and insert the pin into the the right pin hole of the jib. And then install linch-pin ㊳ to prevent pin ㊲ from falling.

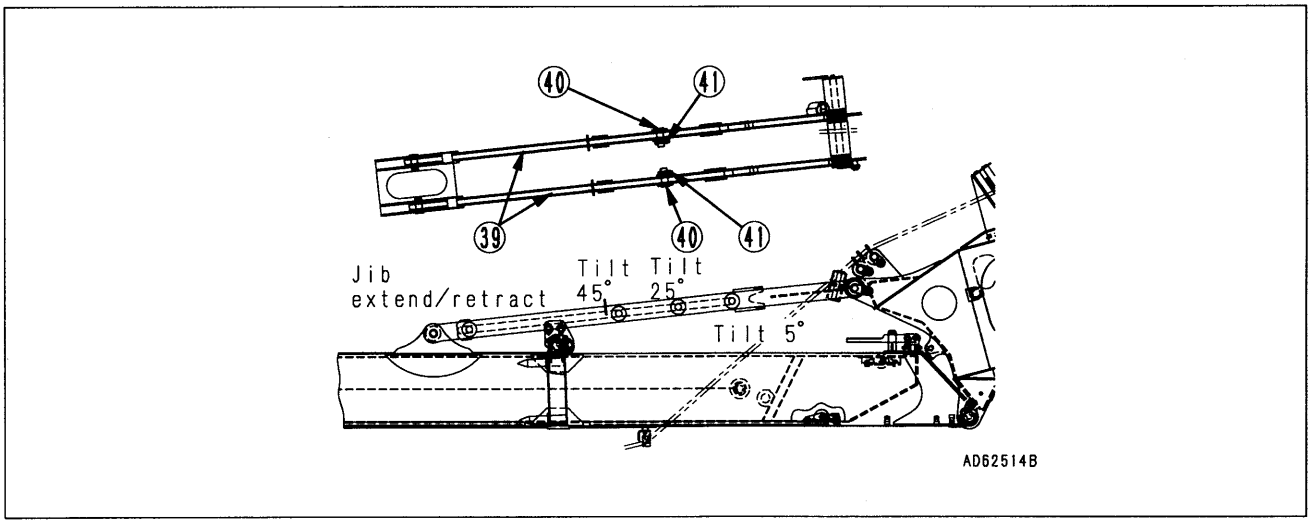


15. Set the jib tilt angle in the following procedures.

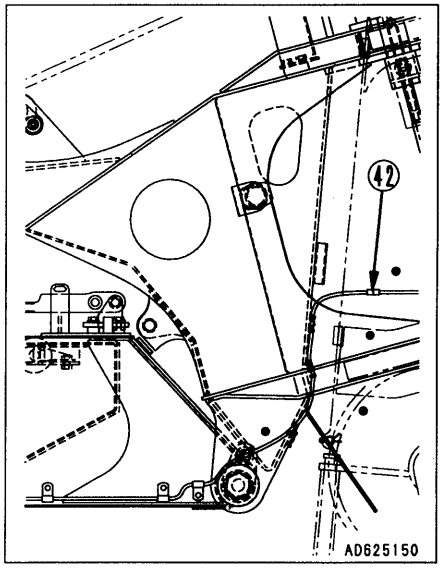
⚠ CAUTION

Always set the tilt angle before telescoping the 2nd stage jib. If the tilt angle has to be changed, carry out re-setting after stowing away the 2nd stage jib.

Remove jib tilt angle setting pins ㊵ (2 places) of tension rod ㊴ and insert the pins set holes for the desired tilt angles (5°, 25°, 45°). Install the linch-pin ㊶ onto the set pins.



16. Remove overwind harness ㊷ from the single top and connect the harness to the jib.



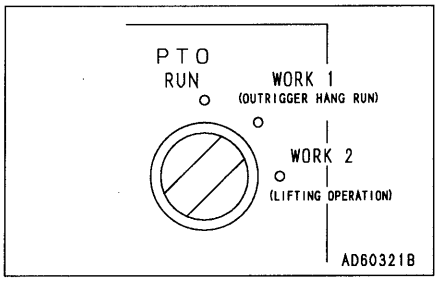
Operate the boom hoist lever and auxiliary winch lever to raise the boom and to lower the auxiliary rope.

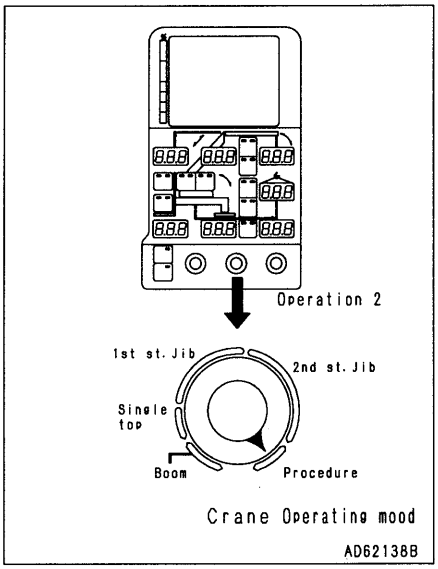
Now, jib extend operations are complete.

27.1.6 STOWING AWAY JIB

⚠ WARNING

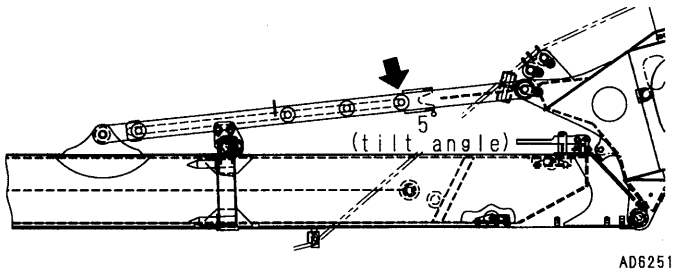
- **Never enter under and front of the jib working area when stowing away the jib.**
  Unexpected movement of the jib may cause injury.
- **When operating the machine on a high place, always use a working be careful not to fall.**
- **When climbing the crane carrier or swing table, always use the specified step or working bench.**
  Never climb the upper face of the outrigger to prevent slipping and injury.





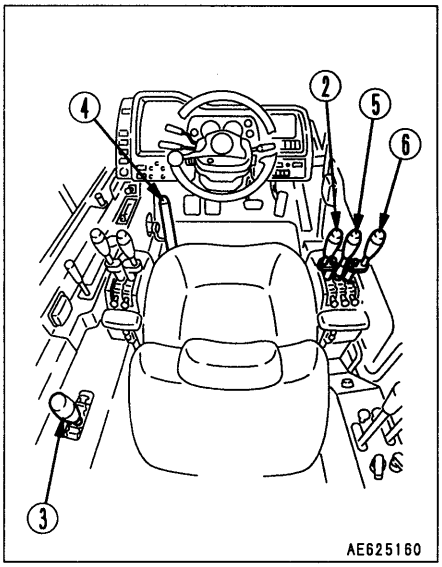
1. Set the PTO switch and MOMENT LIMITER (overload prevention system) in the following procedures.

1. Set PTO switch ① to "WORK 1".
2. Keep the boom to 2nd stage or shorter and set the crane operating mode switch of MOMENT LIMITER (overload preventive system) to the "PROCEDURE" position.
3. Stow away the jib onto 1st stage boom. For jib stowing away, see "27.1.8 RETRACTING TOP JIB".
4. After stowing away the jib onto the 1st stage boom, operate auxiliary winch operation lever ② to wind in the auxiliary rope until the auxiliary hook contacts to the jib tip and to lift the jib while idling the engine. At this state, lower the boom to the position that the jib tilt angle setting pin can be inserted, and then insert the pin into the "TILT ANGLE 5°" position on the jib tension bar.



5. Operate boom telescoping operation lever ③ while winding out the main and auxiliary winches or pedal ④ while setting the pedal selector switch to "ELASTICITY" to keep the boom to the 2nd stage.

6. Operate boom hoist lever ⑥ while winding in the main hook by main winch lever ⑤ to lower the boom fully.

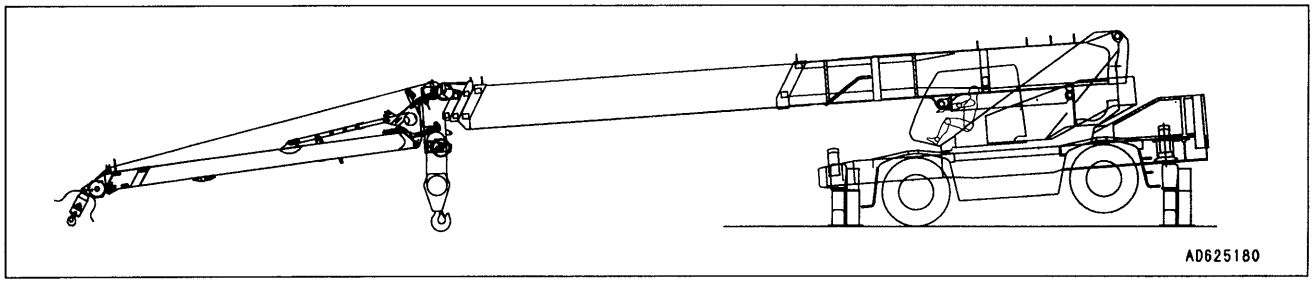


2. Taking front leaning posture.

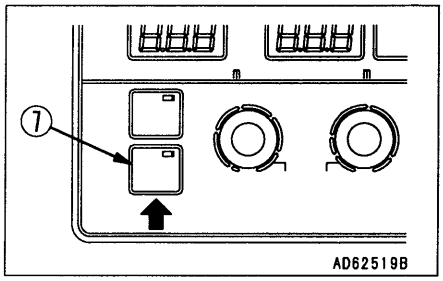
⚠ CAUTION

If the machine inclines laterally, excessive force produced in the jib when stowing the jib may cause deformation or damage to make jib stowing operation impossible.

1. Operate the outrigger slide and jack selector switch to retract the front outrigger and jack cylinder so that the machine inclines forward within 3° and keeps horizontal position in the lateral direction.



2. Press MOMENT LIMITER (overload prevention system) setting switch ⑦ to reset the outrigger extending width.



3. Remove the jib right pin in the following procedures.

⚠ WARNING

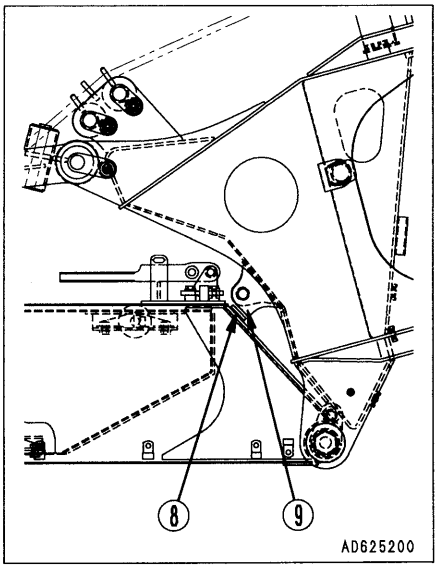
- **Sudden winch operation may cause damage to the jib. Use the winch slowly while keeping engine idle.**
- **If the boom is lowered while contacting the jib foot to the tilt bracket stopper, the jib can be damaged by rope tension.**

⚠ CAUTION

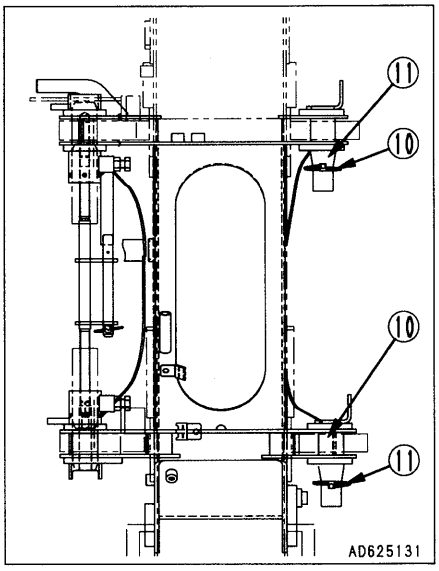
- **Set auxiliary overwind weight firmly to the upper face of the auxiliary hook so as not to fall.**

1. Operate the auxiliary winch operation lever to wind in the auxiliary rope and to contact the auxiliary hook to the jib tip.

2. Wind in the auxiliary rope at engine idling. Then, relieve the rope until it contacts to jib foot ⑧ and tilt bracket stopper ⑨.



3. Remove linch-pin ⑩ for the right pins (2 places) and remove the pin ⑪. Mount it on the side of the jib bracket.

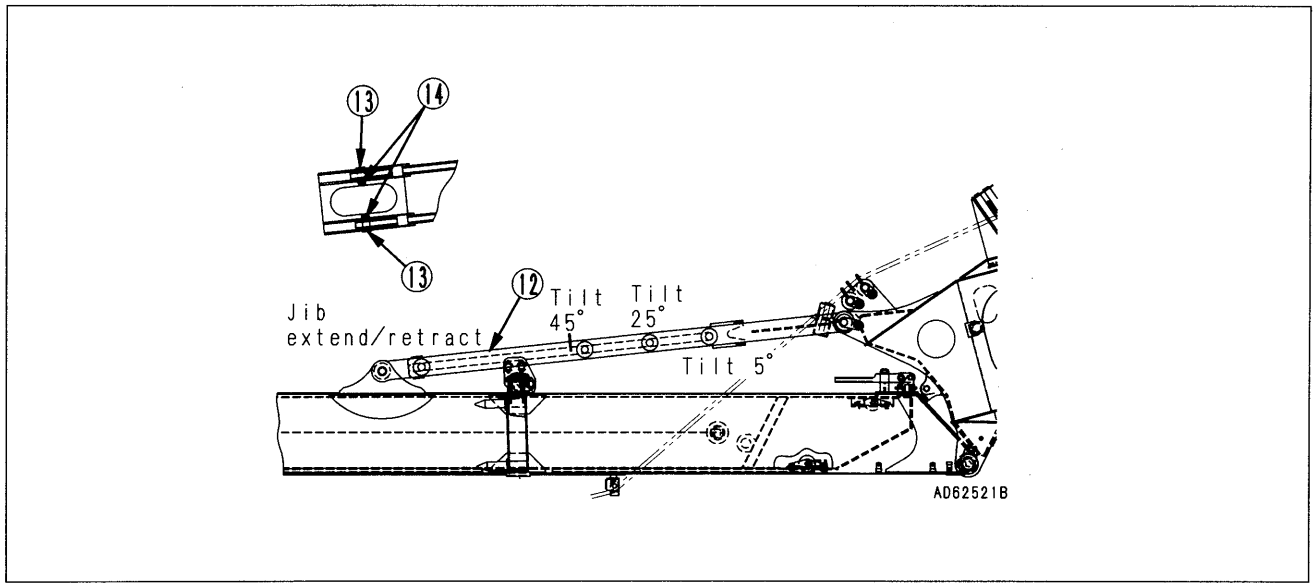


4. Insert the jib tilt angle setting pin into the "JIB EXTEND/ RETRACT" position.

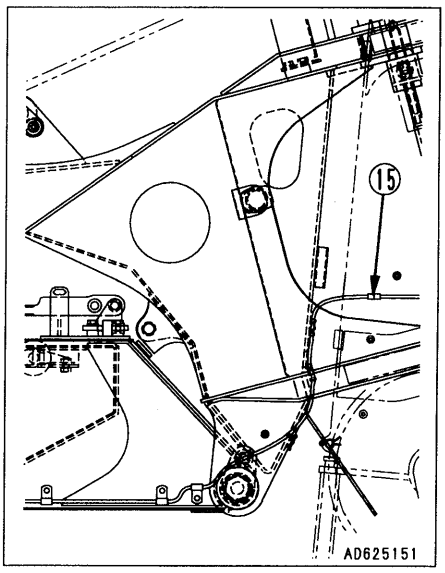
⚠ CAUTION

If the jib tilt angle pin is not inserted into the "JIB EXTEND/ RETRACT" position, the jib can not be tilted downward and not be rotated.

Remove jib tilt angle setting pin ⑬ inserted into the "TILT ANGLE: 5°" position on tension rod ⑫. Insert the setting pin into the "JIB EXTEND/RETRACT" position and install linch-pin ⑭ around the setting pin.



5. Remove overwind harness ⑮ from the jib and connect the harness to the single top.

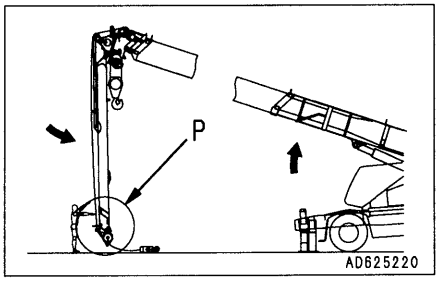


6. Wind out the auxiliary hook and swing the jib vertically while hoisting up the boom in the following procedures.

⚠ WARNING

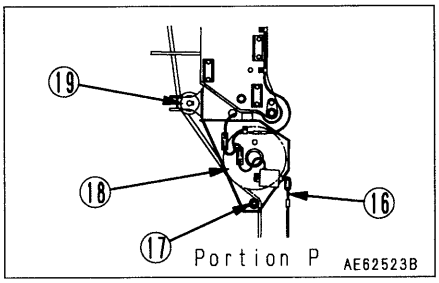
- **Before swinging the jib vertically, make sure that there is no operator in the working area.**
- **If the boom is raised while the auxiliary hook is not wound out, the jib can be damaged by the tension of the rope.**

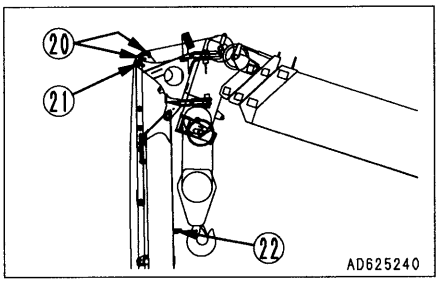
1. Operate the auxiliary winch lever and boom hoisting lever to raise the boom and to swing the jib vertically while winding out the auxiliary hook.
2. When the boom angle reaches approx. 26°, operate the auxiliary winch lever to contact the auxiliary hook to the ground.
3. Operate the boom hoisting lever to lower the boom to approx. 20°, then the jib will swing vertically.



7. Remove the overwind weight and place the auxiliary rope as described in the following procedures.

1. Remove wire ⑯ of the overwind detection weight from the overwind switch and the jib.
2. Remove pin ⑰ used to prevent the auxiliary rope from coming off. Remove the rope from jib tip sheave ⑱ and jib idler sheave ⑲.
3. Place the auxiliary rope on the jib side rollers ⑳ and rope guide plate ㉑. Bend the rope to the left and place it on jib bottom roller ㉒.





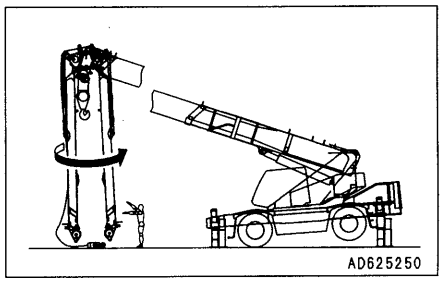
8. Rotate the jib in the following procedures.

⚠ CAUTION

If the boom is lowered excessively, the jib rotates slightly (under 18°) and then returns to the original position.

1. Pull the jib while holding the jib tip. Rotate the jib to locate it on the side of the boom.

2. Make sure that wire tension is adequate, Pull nearer the wire to prevent slack.



9. Raise the boom to 78° to 80° and mount the boom in the following procedures.

⚠ WARNING

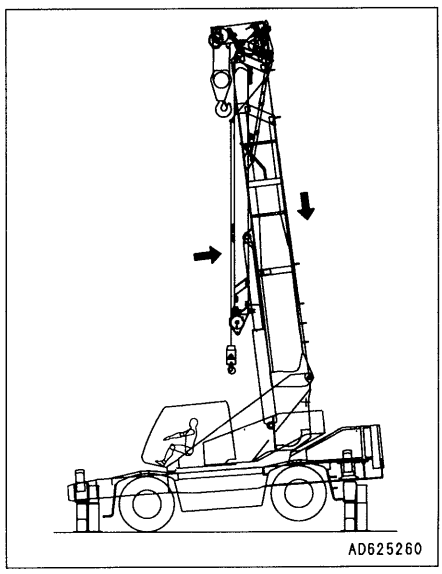
Before raising the boom to 78° to 80°, never extend the boom to 8.6 m (28 ft 2 in). Otherwise the jib or guard rail on the boom side could be damaged.

⚠ CAUTION

If the boom angle exceeds "80°", the alarm sounds and boom raising operation stops automatically.

1. Operate the boom hoist lever to raise the boom to 78° to 80°. Operate the auxiliary winch operation lever and boom telescope operation lever to retract the boom to 8.6 m (28 ft 2 in) while winding in the auxiliary rope.

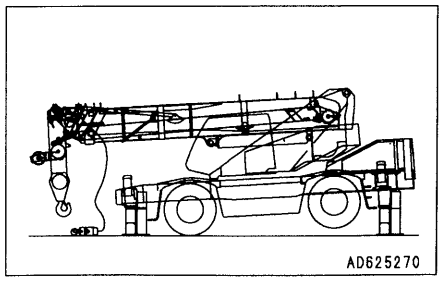
2. When the boom is retracted additionally, the jib roller will ride on the boom guide rail. After confirming this conditon, retract the boom fully. Be sure that the jib mounted on the jib mount position on the boom.



10. Place the auxiliary hook on the ground in the following procedures.

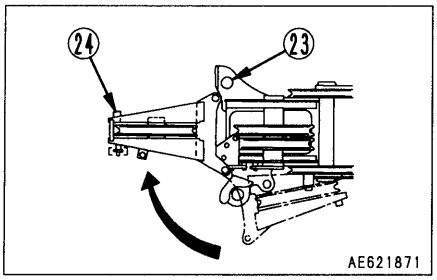
1. Operate the boom hoist lever to lower the boom. When the boom angle reaches approx. 10°, operate the auxiliary winch lever to place the auxiliary hook on the ground.

2. Lower the boom fully.



11. Extend the single top in the following procedures.

Remove the lock pin ㉓ for the single top stowed away. Extend single top ㉔ and then lock the single top with the lock pin ㉓.

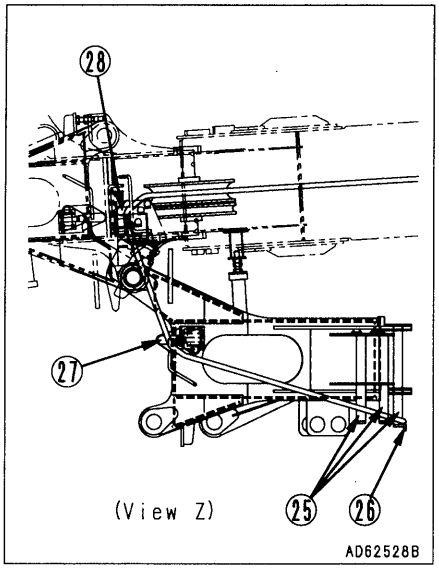


12. Pass the auxiliary rope on the sheave of the single top and connect the rope to the overwind weight in the following procedures.

⚠ CAUTION

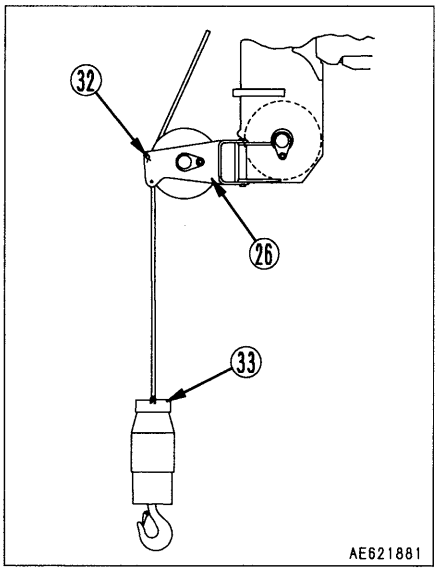
If the rope is not removed from the guide roller retaining bar in front of the boom idler sheave, the bar could be damaged.

1. Remove the auxiliary rope from side rollers ㉕, rope guide plate ㉖ and remove the rope from the retaining bars for jib side guide roller ㉗ and guide roller ㉘ in front of the top boom idler sheave.



2. Remove rope guide pin ㉙ of single top ㉔. Pass the rope around the sheave of the single top and install the pin ㉙.

3. Install the wire of the overwind detection weight ㉚ to the single top.

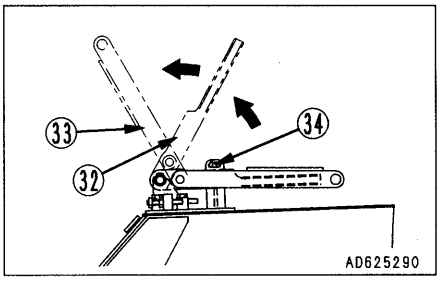


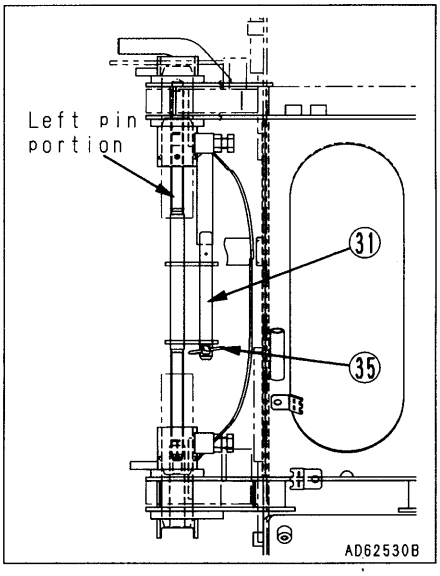
13. Install the tilt bracket lock lever using the following procedures.

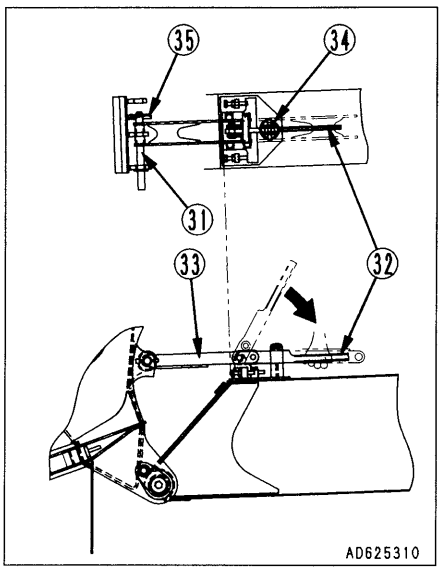
⚠ WARNING

Before removing the left pin, apply the tilt lock lever to the tilt bracket. If the jib is removed from the boom while the lock lever is not applied to the tilt bracket, it will swing downward causing injury or damage.

1. Remove the lock pin ㉛ inserted in the hole of the lock plate as a locking device for the left pin.
2. Remove linch-pin ㉞ for handle ㉜ and lock lever ㉝. Tilt handle ㉜ to the tilt bracket side.
3. Install the lock pin ㉛ after align the lock lever ㉝ with the tilt bracket holding hole and then install linch-pin ㉟ for the lock pin.
4. Lower handle ㉜ and lock the handle with linch-pin ㉝.



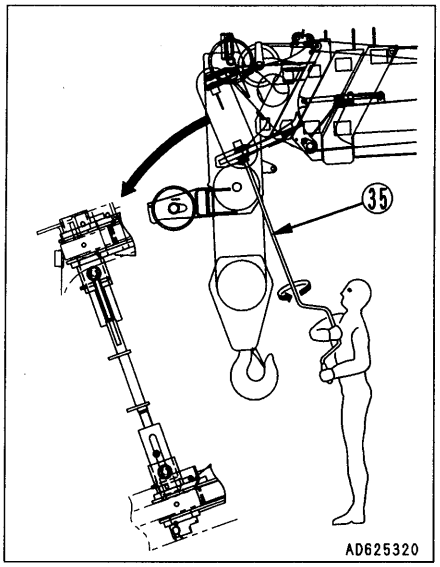




14. Remove the jib left pin in the following procedures.

After inserting the handle ㉟ from the bottom of the left pin, turn the handle counterclockwise to remove the pin.

Turns of the handle: approx. 35 (for reference only)



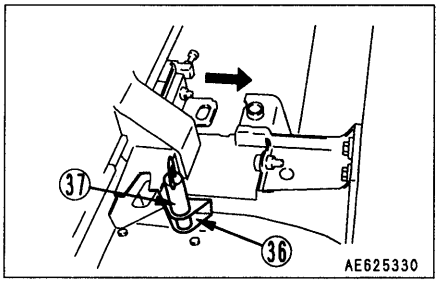
15. Stow away the jib onto the boom side.

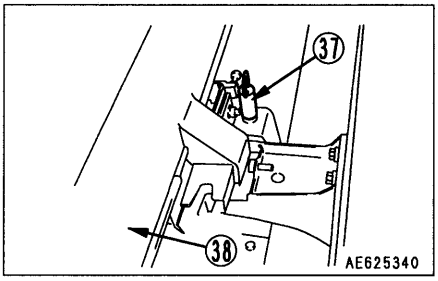
⚠ WARNING

If the jib stowing pin is not installed, the jib can be fall away when traveling the machine or operating the crane.

1. Remove jib stowing pin ㊲ from positioning bracket ㊱.

2. Push jib ㊳ fully toward the boom side and insert jib stowing pin ㊲. Then, install the linch-pin for the pin ㊲.





After all procedures are completed, operate the boom hoist lever and boom telescope lever to extend the boom after raising. Then, wind out the auxiliary hook.

Now, jib stowing-away operation is completed.

27.1.7 EXTENDING TOP JIB

⚠ WARNING

- **Never stand in front of jib extending area. Unexpected jib movement may cause accident or injury.**
- **When operating the machine on a high place, always use a work bench and be careful not to fall.**
- **Always use the specified jib lock pin to prevent it from falling away.**

1. Carry out the following preparations.

1. Retract the boom fully. Set the crane operating mode switch of MOMENT LIMITER (overload prevention system) to "Procedure". Lower the boom to the position where the top jib holding pin can be removed. Or, this may be done by retracting the jack cylinder. In this case, re-entry of the outrigger width is needed.

2. Set the overwind detection weight to the auxiliary hook and wind in the auxiliary rope until the auxiliary hook touches the jib tip.

REMARK

The overwind detection weight should be placed onto the auxiliary hook.

3. Remove the connector of the overwind detection limit switch located on the jib tip.

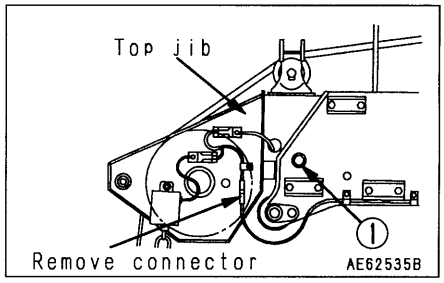
2. Extend the top jib.

⚠ WARNING

- **Never stand in front of jib extending area. Sudden jib movement may cause accident or injury.**

1. Remove top jib holding pin ①.

2. If the auxiliary rope is loosened, the top jib (for two stage jib) will be extended.

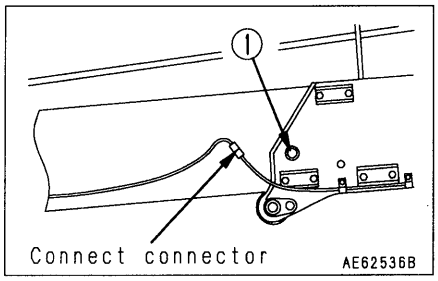


REMARK

When loosening the auxiliary rope, raise the boom so that the jib tip does not touch the ground. If the top jib will not be extended, try to tense or loosen the auxiliary rope,

3. After the top jib is extended, insert top jib holding pin ①.

4. Connect the connector of the overwind detection limit switch.



27.1.8 RETRACTING TOP JIB

1. Carry out the following preparation

1. Retract the boom to two-stage or shorter and set MOMENT LIMITER (overwind prevention system) crane operating mode switch to the "Procedure" position. When the tilt angle was set to 25° or 45°, retract the boom fully to allow the top jib holding pin to be removed where a bench is used. Lower the boom close to the ground. Or, this may be done by retracting the jack cylinder according to the angle. In this case, re-entry of the outrigger width is needed.

2. Wind in the auxiliary hook until it touches to the jib tip, after placing the overwind detection weight on the auxiliary hook.

3. Remove the connector from the overwind detection limit switch on the top jib joint.

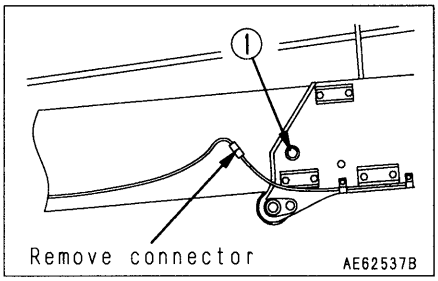
2. Retract the jib.

1. Remove top jib holding pin ①.

2. Retract the top jib by winding in the auxiliary rope.

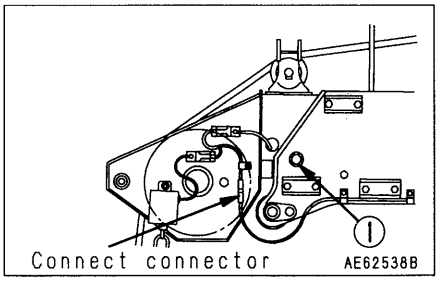
REMARK

Wind in the auxiliary rope slowly. Lower the boom gradually so as to move the jib tip horizontally.



3. After the top jib is extended, insert top jib holding pin ①.

4. Connect the connector of the overwind detection limit switch.



28. SERVICE PROCEDURE

28.1 EVERY 250 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

28.1.1 GREASING

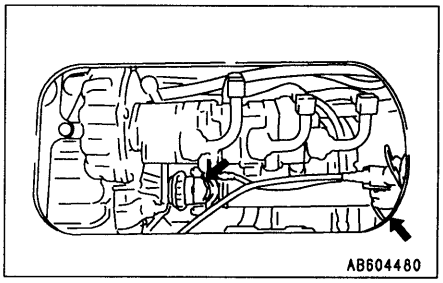
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.

2. After greasing, wipe off any old grease that is pushed out.

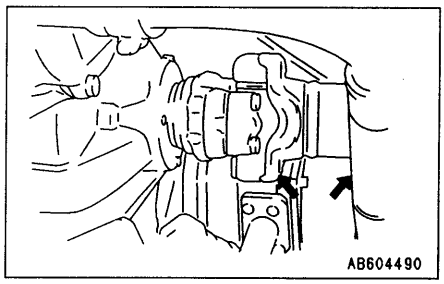
Use the brands of grease shown below.

Manufacturer	Name	Greasing point
Komatsu	G2-LI	1. Drive shaft 2. Axle joint
Nippon Molybdenum	Nichimoly PC-1	3. Clearance of suspension leaf spring plate 4. Outrigger beam (inner warp) 5. Outrigger float [X-shaped outrigger] 6. Outrigger support lever pin [X-shaped outrigger] 7. Outrigger jack cylinder trunnion pin [X-shaped outrigger] 8. Outrigger float [H-shaped outrigger] 9. Jib and jib tilt bracket connecting pin 10. Jib connecting pin 11. Telescope hose reel hose
Dow Corning	Molycoat BR1-S	

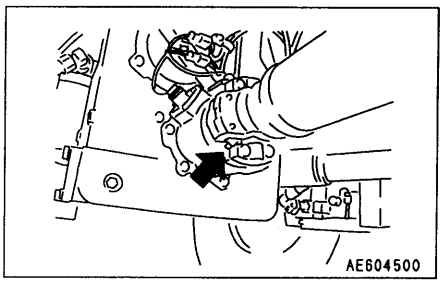
1. Drive shaft
   Damper – torque converter (2 places)



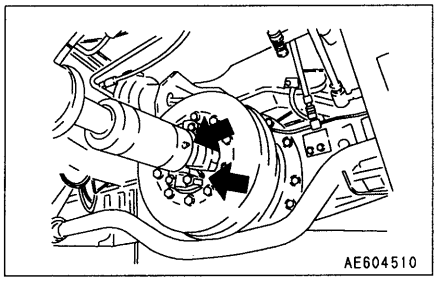
   Transmission – axle (rear) (2 places)

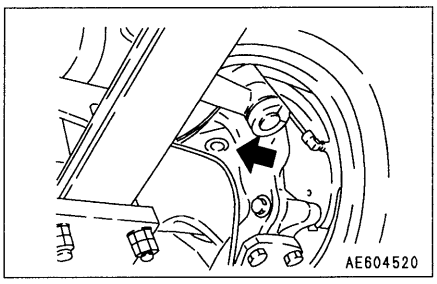


   Transmission – axle (front) (2 places)
   The retarder mounted machine has 4 greasing points of transmission – retarder – axle (front).

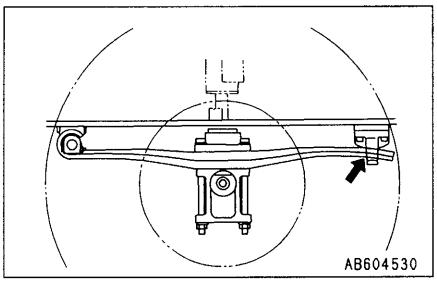


2. Axle joint (6 places)
Check the position of the grease fitting on the axle joint through the greasing hole and move the machine so that the grease fitting faces the greasing hole, then carry out the greasing.
(Front axle 4 places, rear axle 2 places)

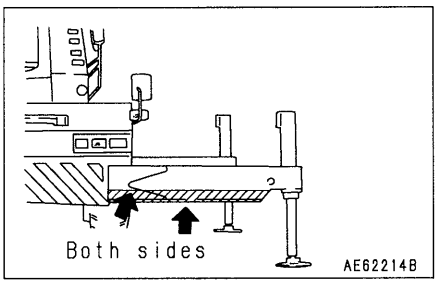

AE604510


AE604520

3. Clearance of suspension leaf spring plate (4 places)

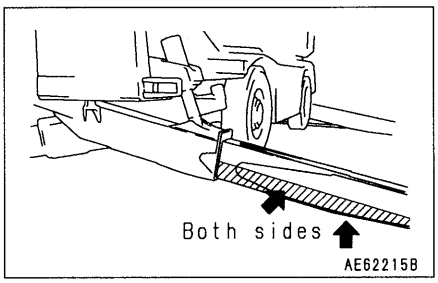

AB604530

4. Outrigger beam (inner wrap) (4 places)
[H-shaped outrigger]



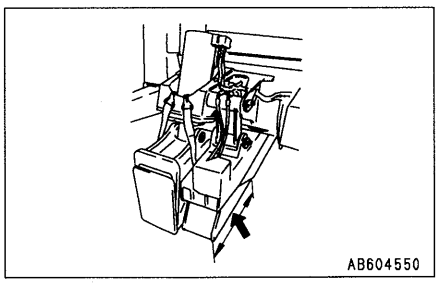
AE622148

[X-shaped outrigger]
When the movement of the outrigger is not smooth, apply grease on the outrigger inner beam sliding part. Especially, apply grease in the depth fully.

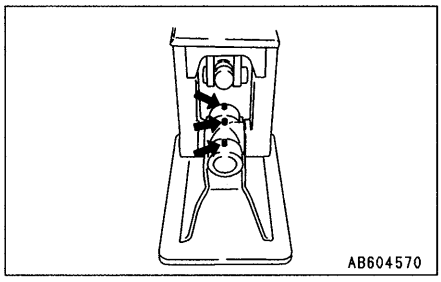


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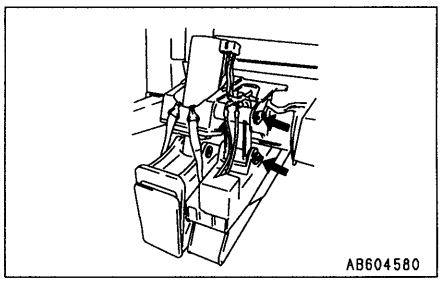
Just under the inner frame outs when storing.


AB604550

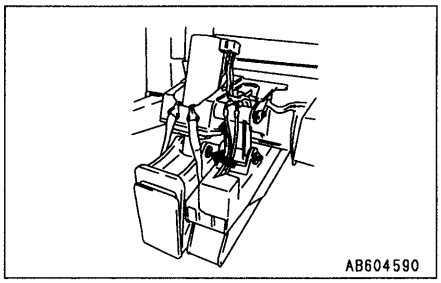
[X-shaped outrigger]
5. Outrigger float (12 places)



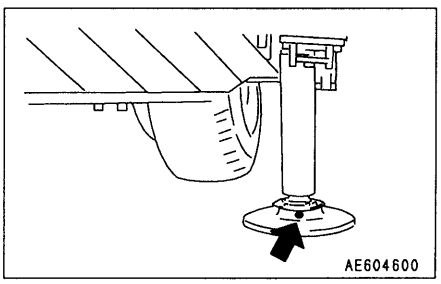
6. Outrigger support lever pin (8 places)



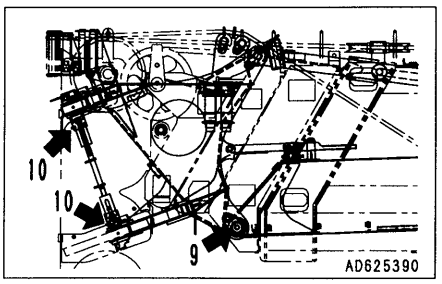
7. Outrigger jack cylinder trunnion pin (4 places)



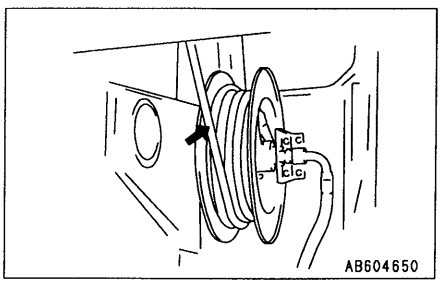
[H-shaped outrigger]
8. Outrigger float (4 places)



9. Jib and jib tilt bracket connecting pin (1 place)
10. Jib connecting pin (2 places)



11. Telescope hose reel hose (1 place)
Apply grease to hose reel using brush or cloth with extending the second boom.



29. SPECIFICATIONS

WING250 (LW250-5)
[Machines equipped with H-shaped outrigger]

PERFORMANCE

	Boom length	Capacity	Conditions
• Crane capacity	7.6 m (24 ft 11 in)	26.0 t x 3.0 m (9 ft 11 in)	Outrigger fully extended, 360° operations
	13.7 m (44 ft 11 in)	21.0 t x 3.5 m (11 ft 6 in)	
	19.8 m (64 ft 11 in)	14.5 t x 4.5 m (14 ft 9 in)	
	25.9 m (84 ft 11 in)	10.6 t x 5.5 m (18 ft)	
	30.5 m (100 ft)	7.0 t x 8.0 m (26 ft 3 in)	
	32.0 m (104 ft 11 in)	5.9 t x 8.0 m (26 ft 3 in)	
	7.6 m (24 ft 11 in)	9.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, 360° operations
	7.6 m (24 ft 11 in)	14.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, over-front operations

• Main winch line speed(high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in)/min
• Auxiliary winch line speed (high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in)/min
• Time taken to raise boom (0° – 83°)		44 sec
• Time taken to extend boom (7.6 m – 32 m)		75 sec
• Travel speed	High range (2WD/4WD)	0 – 49 km/h (0 – 30 MPH)
	Low range (4WD)	0 – 21 km/h (0 – 13 MPH)
• Min. turning radius	2-wheel steering	9.3 m (30 ft 6 in)
	4-wheel steering	5.4 m (17 fc 8 in)

WEIGHT

• Operating weight (not including operator)	26,870 kg (59,250 lb)

BOOM

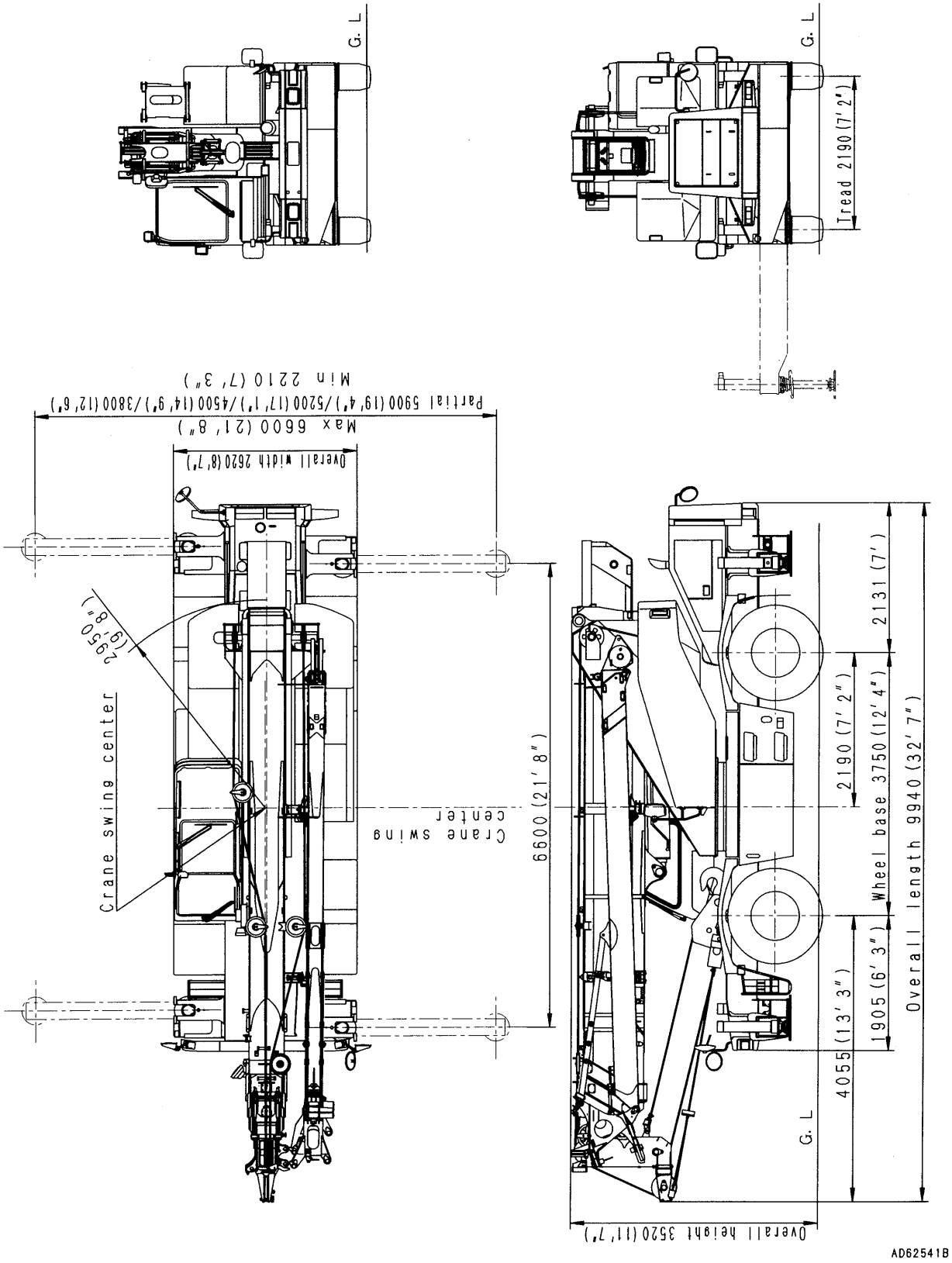
• Boom length		7.6 m – 32 m (24 ft 11 in – 104 ft 11 in)
• Wire rope dimensions	Main winch	Ø 16 mm x 176 m (Ø 0.63 in x 577 ft)
	Auxiliary winch	Ø 16 mm x 98 m (Ø 0.63 in x 321 ft 4 in)
• Type of rope		JIS No. 18 7x7+6xFi(29) B type, normal Z lay

ENGINE

• Type	Komatsu S6D125E-2 diesel engine
• Rated horsepower	184 kW (247 HP) / 2,100 rpm
• Max. torque	1,030 N•m (105 kgf•m) / 1,400 rpm
• Starting motor	24 V 7.5 kW
• Alternator	24 V 50 A
• Battery	12 V 120 Ah x 2 pieces

TIRE

• Size	Front wheel	385/95R25
	Rear wheel	385/95R25


G. L
Tread 2190 (7' 2")
Min 2210 (7' 3")
Partial 5900 (19' 4")/5200 (17' 1")/4500 (14' 9")/3800 (12' 6")
Max 6600 (21' 8")
Overall width 2620 (8' 7")
2950 (9' 8")
Crane swing center
Crane swing center
6600 (21' 8")
2131 (7')
2190 (7' 2")
Wheel base 3750 (12' 4")
1905 (6' 3")
4055 (13' 3")
Overall length 9940 (32' 7")
G. L
Overall height 3520 (11' 7")
AD62541B

WING250 (LW250-5)
[Machines equipped with X-shaped outrigger]

PERFORMANCE

	Boom length	Capacity	Conditions
• Crane capacity	7.6 m (24 ft 11 in)	26.0 t x 3.0 m (9 ft 10 in)	Outrigger fully extended, 360° operations
	13.7 m (44 ft 11 in)	21.0 t x 3.5 m (11 ft 6 in)	
	19.8 m (64 ft 11 in)	14.5 t x 4.5 m (14 ft 9 in)	
	25.9 m (84 ft 11 in)	10.6 t x 5.5 m (18 ft)	
	30.5 m (100 ft)	7.0 t x 8.0 m (26 ft 3 in)	
	32.0 m (104 ft 11 in)	5.9 t x 8.0 m (26 ft 3 in)	
	7.6 m (24 ft 11 in)	9.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, 360° operations
	7.6 m (24 ft 11 in)	14.0 t x 3.0 m (9 ft 10 in)	Outrigger not used, over-front operations

• Main winch line speed(high-low) 4 levels		130 – 65 m (426 ft 3 in – 213 ft 1 in) / min
• Auxiliary winch line speed (high-low) 4 levels		130 – 65 m (426 ft 3 in – 230 ft 1 in) / min
• Time taken to raise boom (0° – 83°)		44 sec
• Time taken to extend boom (7.6 m – 32 m)		75 sec
• Travel speed	High range (2WD/4WD)	0 – 49 km/h (0 – 30 MPH)
	Low range (4WD)	0 – 21 km/h (0 – 13 MPH)
• Min. turning radius	2-wheel steering	9.3 m (30 ft 6 in)
	4-wheel steering	5.4 m (17 ft 8 in)

WEIGHT

• Operating weight (not including operator)	26,870 kg (59,250 lb)

BOOM

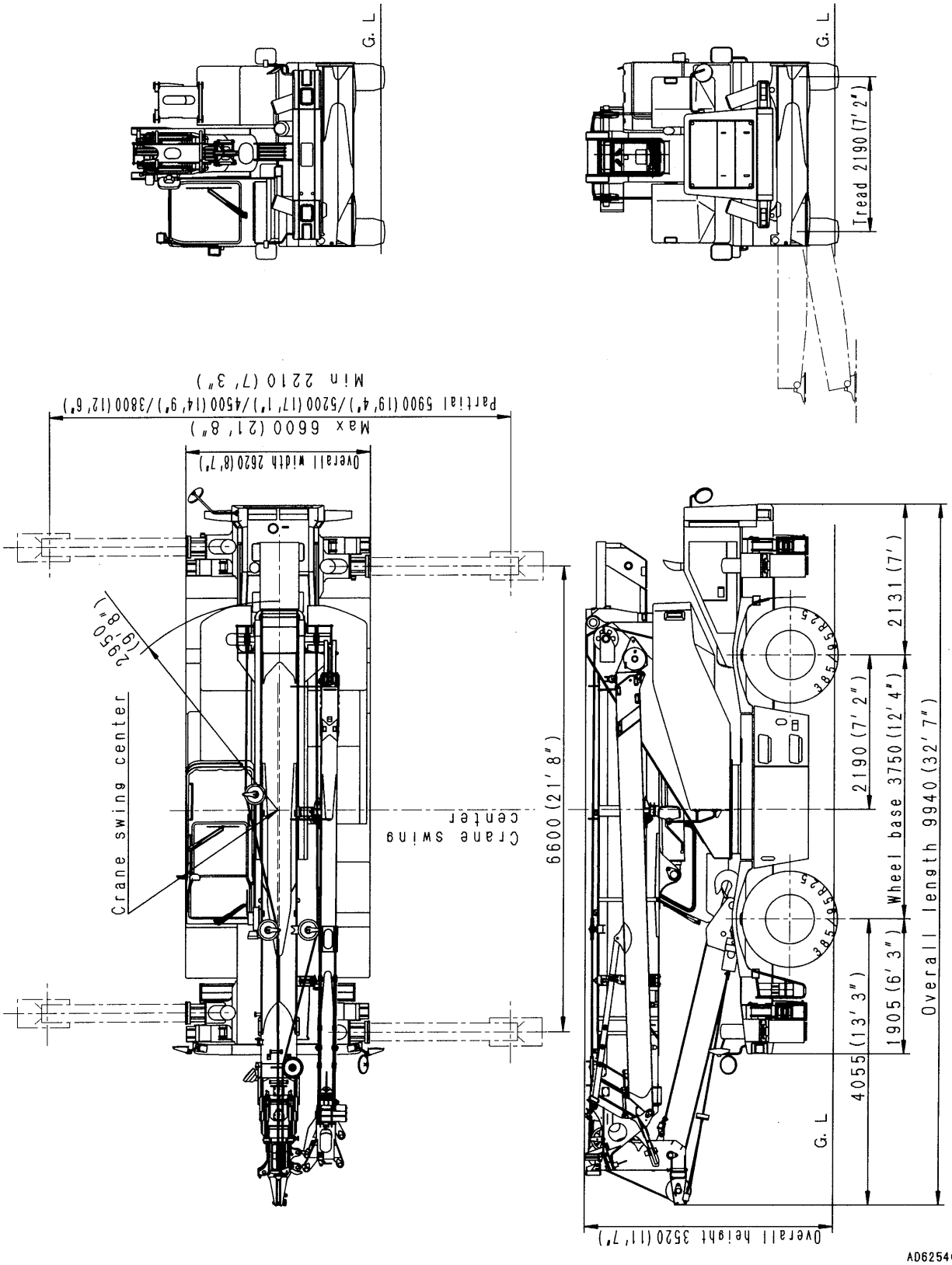
• Boom length		7.6 m – 32 m (24 ft 11 in – 104 ft 11 in)
• Wire rope dimensions	Main winch	Ø 16 mm x 176 m (Ø 0.63 in x 577 ft)
	Auxiliary winch	Ø 16 mm x 98 m (Ø 0.63 in x 321 ft 4 in)
• Type of rope		JIS No. 18 7x7+6xFi(29) B type, normal Z lay

ENGINE

• Type	Komatsu S6D125E-2 diesel engine
• Rated horsepower	184 kW (247 HP) / 2,100 rpm
• Max. torque	1,030 N•m (105 kgf•m) / 1,400 rpm
• Starting motor	24 V 7.5 kW
• Alternator	24 V 50 A
• Battery	12 V 120 Ah x 2 pieces

TIRE

• Size	Front wheel	385/95R25
	Rear wheel	385/95R25


G. L
Tread 2190 (7' 2")
Min 2210 (7' 3")
Partial 5900 (19' 4")/5200 (17' 1")/4500 (14' 9")/3800 (12' 6")
Max 6600 (21' 8")
Overall width 2620 (8' 7")
2950 (9' 8")
Crane swing center
Crane swing center
6600 (21' 8")
2131 (7')
2190 (7' 2")
Wheel base 3750 (12' 4")
1905 (6' 3")
4055 (13' 3")
Overall length 9940 (32' 7")
G. L
Overall height 3520 (11' 7")
AD62540B

- Manual tilt jib operations with outriggers set (30.5 m (100 ft) boom + auxiliary jib operation)

(Unit : ton)

Outriggers fully extended 6.6m (360) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	3.00	2.10	1.60	83.0	2.00	1.15	0.80
80.0	3.00	2.10	1.60	80.0	2.00	1.15	0.80
75.0	3.00	2.10	1.60	75.0	2.00	1.15	0.80
72.0	3.00	2.10	1.60	72.0	1.80	1.12	0.80
70.0	2.95	2.10	1.60	70.0	1.70	1.07	0.80
65.0	2.55	1.97	1.56	65.0	1.45	0.97	0.79
60.0	2.15	1.75	1.44	60.0	1.25	0.91	0.76
55.0	1.60	1.45	1.33	55.0	1.12	0.86	0.74
50.0	1.15	1.05	1.02	50.0	0.89	0.79	0.73
45.0	0.80	0.73	0.72	45.0	0.59	0.57	0.54
40.0	0.50	0.48		40.0	0.40	0.39	
37.0	0.41	0.38					
35.0	0.35						
Danger angle	33°	35°	43°	Danger angle	38°	38°	43°

Outriggers partially extended 5.9m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	3.00	2.10	1.60	83.0	2.00	1.15	0.80
80.0	3.00	2.10	1.60	80.0	2.00	1.15	0.80
75.0	3.00	2.10	1.60	75.0	2.00	1.15	0.80
72.0	3.00	2.10	1.60	72.0	1.80	1.12	0.80
70.0	2.95	2.10	1.60	70.0	1.70	1.07	0.80
65.0	2.55	1.97	1.56	65.0	1.45	0.97	0.79
60.0	1.83	1.65	1.44	60.0	1.25	0.91	0.76
55.0	1.25	1.15	1.10	55.0	0.95	0.85	0.74
50.0	0.83	0.76	0.75	50.0	0.61	0.55	0.53
45.0	0.50	0.47	0.45	48.0	0.48	0.45	0.43
Danger angle	43°	43°	43°	Danger angle	46°	46°	46°

Outriggers partially extended 5.2m (Over-side) X, H type							
Boom angle (°)	7.4m			Boom angle (°)	12.6m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	3.00	2.10	1.60	83.0	2.00	1.15	0.80
80.0	3.00	2.10	1.60	80.0	2.00	1.15	0.80
75.0	3.00	2.10	1.60	75.0	2.00	1.15	0.80
72.0	3.00	2.10	1.60	72.0	1.80	1.12	0.80
70.0	2.95	2.10	1.60	70.0	1.70	1.07	0.80
65.0	2.10	1.87	1.56	65.0	1.45	0.97	0.79
60.0	1.40	1.22	1.21	60.0	1.03	0.89	0.76
55.0	0.85	0.77	0.76	55.0	0.63	0.55	0.51
50.0	0.46	0.43	0.42	53.0	0.47	0.43	0.40
Danger angle	48°	48°	48°	Danger angle	51°	51°	51°

AD62542B

- Manual tilt jib operations with outriggers set (30.5 m (100 ft) boom + auxiliary jib operation)

(Unit:ton)

Outriggers partially extended 4.5m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	3.00	2.10	1.60	83.0	2.00	1.15	0.80
80.0	3.00	2.10	1.60	80.0	2.00	1.15	0.80
75.0	3.00	2.10	1.60	75.0	2.00	1.15	0.80
72.0	2.90	2.10	1.60	72.0	1.80	1.12	0.80
70.0	2.50	2.10	1.60	70.0	1.70	1.07	0.80
65.0	1.61	1.42	1.31	65.0	1.18	0.95	0.79
60.0	0.93	0.85	0.78	60.0	0.65	0.58	0.51
55.0	0.44	0.40	0.40				
Danger angle	53°	53°	53°	Danger angle	58°	58°	58°

Outriggers partially extended 3.8m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	3.00	2.10	1.60	83.0	2.00	1.15	0.80
80.0	3.00	2.10	1.60	80.0	2.00	1.15	0.80
75.0	3.00	2.10	1.60	75.0	2.00	1.15	0.80
72.0	2.35	1.95	1.60	72.0	1.80	1.12	0.80
70.0	1.92	1.66	1.50	70.0	1.48	1.07	0.80
65.0	1.05	0.94	0.86	65.0	0.75	0.63	0.55
60.0	0.46	0.42					
Danger angle	58°	58°	63°	Danger angle	63°	63°	63°

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- Manual tilt jib operations with outriggers set (32.0 m (104 ft 11 in) boom + auxiliary jib operation)

(Unit : ton)

Outriggers fully extended 6.6m (360) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	2.60	1.80	1.60	83.0	1.70	1.00	0.70
80.0	2.60	1.80	1.60	80.0	1.70	0.96	0.70
75.0	2.60	1.80	1.60	75.0	1.70	0.87	0.69
72.0	2.60	1.80	1.51	72.0	1.45	0.83	0.66
70.0	2.50	1.80	1.46	70.0	1.30	0.80	0.64
65.0	2.02	1.57	1.33	65.0	1.05	0.72	0.59
60.0	1.70	1.31	1.15	60.0	0.92	0.66	0.56
55.0	1.30	1.11	0.98	55.0	0.78	0.63	0.54
50.0	0.97	0.88	0.85	50.0	0.64	0.53	0.51
45.0	0.65	0.58	0.58	45.0	0.45	0.44	0.42
40.0	0.37	0.37		42.0	0.38	0.37	
Danger angle	38°	38°	43°	Danger angle	40°	40°	43°

Outriggers partially extended 5.9m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	2.60	1.80	1.60	83.0	1.70	1.00	0.70
80.0	2.60	1.80	1.60	80.0	1.70	0.96	0.70
75.0	2.60	1.80	1.60	75.0	1.70	0.87	0.69
72.0	2.60	1.80	1.51	72.0	1.45	0.83	0.66
70.0	2.50	1.80	1.46	70.0	1.30	0.80	0.64
65.0	2.02	1.57	1.33	65.0	1.05	0.72	0.59
60.0	1.65	1.31	1.15	60.0	0.92	0.66	0.56
55.0	1.05	1.00	0.95	55.0	0.80	0.63	0.54
50.0	0.65	0.62	0.60	50.0	0.51	0.45	0.42
47.5	0.51	0.48	0.47				
Danger angle	46°	46°	46°	Danger angle	48°	48°	48°

Outriggers partially extended 5.2m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	2.60	1.80	1.60	83.0	1.70	1.00	0.70
80.0	2.60	1.80	1.60	80.0	1.70	0.96	0.70
75.0	2.60	1.80	1.60	75.0	1.70	0.87	0.69
72.0	2.60	1.80	1.51	72.0	1.45	0.83	0.66
70.0	2.50	1.80	1.46	70.0	1.30	0.80	0.64
65.0	1.90	1.57	1.33	65.0	1.05	0.72	0.59
60.0	1.22	1.07	1.02	60.0	0.88	0.66	0.56
55.0	0.70	0.63	0.61	55.0	0.48	0.45	0.41
52.0	0.48	0.43	0.40				
Danger angle	50°	50°	50°	Danger angle	53°	53°	53°

AD62544B

- Manual tilt jib operations with outriggers set (32.0 m (104 ft 11 in) boom + auxiliary jib operation)

(Unit:ton)

Outriggers partially extended 4.5m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	2.60	1.80	1.60	83.0	1.70	1.00	0.70
80.0	2.60	1.80	1.60	80.0	1.70	0.96	0.70
75.0	2.60	1.80	1.60	75.0	1.70	0.87	0.69
72.0	2.60	1.80	1.51	72.0	1.45	0.83	0.66
70.0	2.25	1.80	1.46	70.0	1.30	0.80	0.64
65.0	1.38	1.25	1.15	65.0	1.05	0.72	0.59
60.0	0.76	0.70	0.64	60.0	0.53	0.48	0.41
57.0	0.47	0.44	0.40				
Danger angle	55°	55°	55°	Danger angle	58°	58°	58°

Outriggers partially extended 3.8m (Over-side) X, H type							
Boom angle (°)	6.8m			Boom angle (°)	12.0m		
	Tilt 5°	Tilt 25°	Tilt 45°		Tilt 5°	Tilt 25°	Tilt 45°
83.0	2.60	1.80	1.60	83.0	1.70	1.00	0.70
80.0	2.60	1.80	1.60	80.0	1.70	0.96	0.70
75.0	2.60	1.80	1.60	75.0	1.70	0.87	0.69
72.0	2.10	1.73	1.51	72.0	1.45	0.83	0.66
70.0	1.70	1.45	1.35	70.0	1.30	0.80	0.64
65.0	0.87	0.78	0.72	65.0	0.60	0.52	0.43
62.0	0.53	0.48	0.41				
Danger angle	60°	60°	60°	Danger angle	63°	63°	63°

AD62545B

Working radius/lifting height chart

The chart below shows the relationship between the operating radius and lifting height when the outriggers are fully extended.

The value given does not include the deflection of the boom and jib.

- Manual tilt jib specification machines

